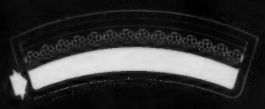
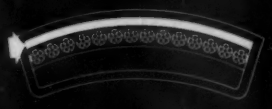
Want to control the Variables on your Variable-speed drives?

Control Slippage with Goodyear Variable-Speed Belts that have a specially compounded, abrasion-resistant cover to take a strong, uniform grip on both sides of the sheave.



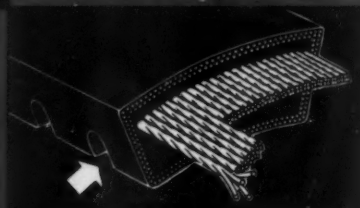
Control "Dishing" with Goodyear Variable-Speed Belts that incorporate a special, fiber-reinforced, synthetic-rubber compression section to resist side pressures – protect from fatigue.

Control Shrinkage-Stretching with Goodyear Variable-Speed Belts that are sinewed by exclusive Triple-Tempered (3-T) Cord for true dimensional stability in storage and in use.

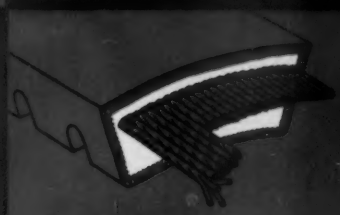


Control Uneven Pull with Goodyear Variable-Speed Belts that feature a special, "cool-running" tension section to assure balance of yield – equalizing pull on either side of the belt.

Control Chafing Action with Goodyear Variable-Speed Belts that have a special "floating gum" insulating section to transfer all the load to the load-carrying cords.



Control Flexibility with Goodyear Variable-Speed Belts that are notched with absolute uniformity to bend easily over small pulleys without sacrifice of rigidity or strength.



Control Uniformity of Cross Section with Goodyear Variable-Speed Belts that are precision-molded for uniformity throughout their full length.

Variable-speed drives are tough enough—without having to contend with variations in the performance of the belts you use.

That's why so many design men insist on the *controlled* quality construction of Variable-Speed Belts by Goodyear. They know these belts are an invariable cure for the headaches so common to variable-speed-drive users.

For the belts that assure you maximum, trouble-free horsepower hours at minimum cost – in a complete range of 371 sizes to meet every need—check with the G.T.M.—Goodyear Technical Man—through your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

IT'S SMART TO DO BUSINESS with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."

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'ROUND ABOUT

with the editors in field and office

Edited by R. L. Marinello

Plant Engineering and Maintenance Seminar

PLANT ENGINEERS will get a chance to compare notes and exchange ideas at the three-day Plant Engineering and Maintenance seminar scheduled for September 22, 23 and 24. It will be held at the State Fair Grounds, Raleigh, North Carolina.

The seminar is being sponsored by the Piedmont and Triangle Chapters of the American Institute of Plant Engineers in cooperation with the Industrial Experimental Program of the North Carolina State College.

Discussions at this three-day seminar will cover such areas as the duties and responsibilities of the plant engineer, the selection and training of maintenance employees, maintenance budgets and cost control procedures, preventive maintenance, and plant and personnel safety. The program will be concluded with a panel discussion of maintenance problems and suggested solutions.

Further information and registration forms may be obtained from J. R. Ogburn, Industrial Experimental Program Staff, School of Engineering, North Carolina State College, Raleigh, North Carolina.

Plant Engineer Appointed

John Connelly has been named plant engineer of the new Royal McBee portable typewriter plant in Springfield, Missouri.

He will have over-all responsibility for the maintenance of plant buildings and equipment. Prior to his appointment, he had been foreman of equipment and utility maintenance for the company plant in Hartford, Conn.

While in Hartford, he was active in the community's fire prevention work, serving as president of the Hartford County Industrial Fire Prevention Association and as a member of the Chamber of Commerce's Fire Prevention Committee.

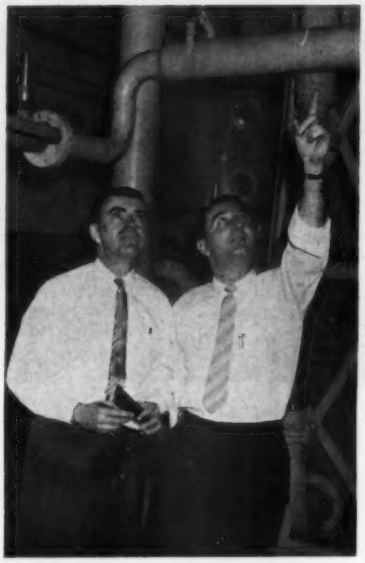
Do You Have a Solvent Problem?

INDUSTRIES MAY find the answers to their solvent problems at the solvent research center of L. Sonneborn Sons, Inc., at Franklin, Pa.

Solvents research, headed up by Dr. Norman Ross, is designed to provide industry with tailor-made solvents to meet a variety of requirements. Facilities, including equipment for chemical treatment, have been engineered to yield solvents meeting rigid specifications with regard to hydrocarbon composition, boiling range, solvency, etc.

Companies having solvent problems should address their inquiries to Department of Industrial Research, L. Sonneborn Sons, Inc., 300 Fourth Avenue, New York 10, N. Y.

Scoop Tours "Park Avenue Plant"

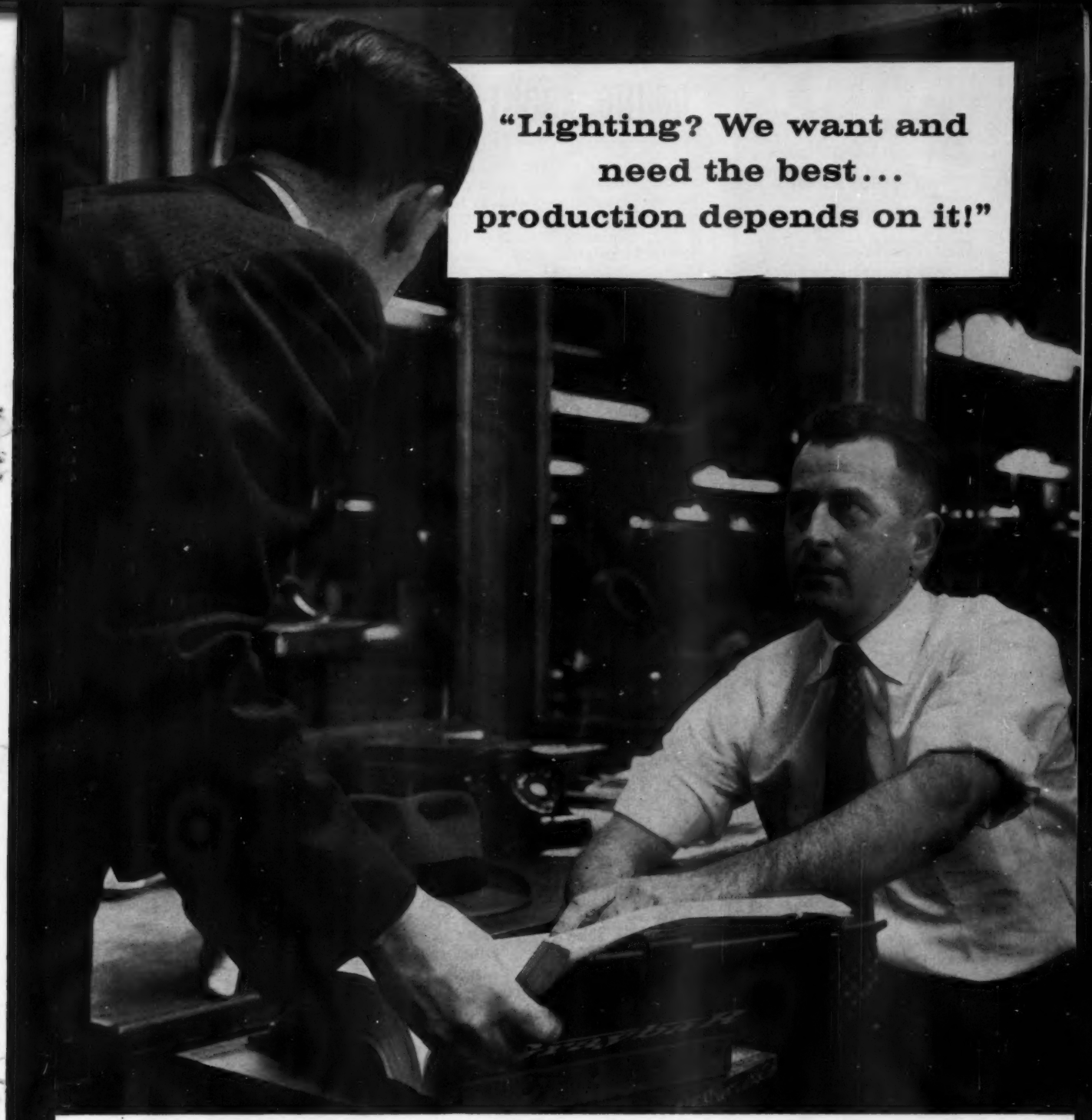


Scoop Skubik, left, Associate Editor of Plant Engineering and E. Barrie Stephens, Assistant Factory Manager, Barden Corporation, Danbury, Conn., pause near the central air compressor equipment on their tour of the new precision bearing plant which has been described as the "Park Avenue plant."

How Old Is Your Transformer?

ARE YOU using a dry-type transformer that has been operating in your plant for 20 years or more? If so, you will want to submit informa-

Subscriptions: U.S.A. $10, Canada $11. Other countries $12 per year. Single copies $1. Change of address: Send to PLANT ENGINEERING, Circulation Division, Barrington, Illinois. Please supply position title, company name, company address. Request must reach us by the 15th of month to make the change effective with following month's issue. Published monthly and accepted as controlled circulation publication at Chicago, Ill.



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Moreover, Graybar offers the widest selection of lighting equipment* available from *any single source!* For lighting . . . or ventilation, motors, controls, power distribution equipment . . . call Graybar. We'll work with you or your electrical contractor. 96

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'ROUND ABOUT

tion on it for consideration in the "Oldest Operating Dry-Type General Purpose Transformer" contest being conducted by General Electric Co.

The company's Specialty Transformer Department, Fort Wayne, Indiana, is offering to trade a brand new Quiet-High Temperature transformer of comparable rating.

Transformers being considered could be rated from 30 to 100 kva and could be a single- or three-phase unit, or a bank of three single-phase units with a standard, general purpose voltage rating of 600 volts or below. The unit must have been in continual operation to February 1, 1959.

This contest will close on Friday, August 28, 1959. Any user having an old unit that might qualify may enter it through any of the General Electric apparatus sales offices or apparatus distributors in this country.

Manager of Maintenance Operations

Harold Wies has been appointed manager of maintenance operations for The Quaker Oats Company. He will move his headquarters to Oregon, Illinois, where he will manage the company central shop as one of the functions of his new job.

He joined the company in 1917 as an employee of the packaging department in Cedar Rapids, Iowa, later serving as chief engineer at Cedar Rapids, Grand Island, Neb., and Memphis, Tenn., before moving to Akron, Ohio, plant as superintendent.

He was transferred to the company headquarters office in Chicago in 1953 as head of the construction division of the engineering and planning department, and was made assistant chief engineer in 1955.

Guide to Parking Lot Layout

PARKING LOTS can be a source of a lot of headaches, and what plant engineer doesn't know that? To help you get the most out of your parking lot, the Western Industries people have published a 40-page book titled, "How to Lay Out a Parking Lot."

Sketches and pictures in the book show how many cars can be parked in a lot with 60 degree angle stalls as compared to stalls located at 90 or 45 degrees. The book also describes parking lot equipment.

Other things to keep in mind when laying out a parking lot, which are discussed in this book, are (1) Is lot on one-way street? (2) Is an alley involved? and (3) What are turnaround requirements?

This book can be procured from Western Industries, Inc., Department 28, 2742 W. 36th Place, Chicago 32, Illinois, for one dollar a copy.

Cooling Tower Study

BASIC CONCLUSIONS have been drawn from the California Redwood Association's eight-year study of the causes and means of preventing premature failure in redwood cooling towers.

The three important conclusions resulting from this study are: (1) The rate of deterioration of redwood in cooling tower service correlates with the treatment and the chemical analysis of the circulating water. (2) The surface deterioration of redwood in cooling tower service may virtually be eliminated by using a nonoxidizing algaecide in the treatment of the circulating water. (3) The tendency for internal decay to develop will be reduced by the same water-treating practices which control surface deterioration.

A copy of this study, identified as Research Project Index No. 5.31320, Interim Report N, may be obtained by writing to the California Redwood Association, 576 Sacramento St., San Francisco 11, California.

Armco Appointments

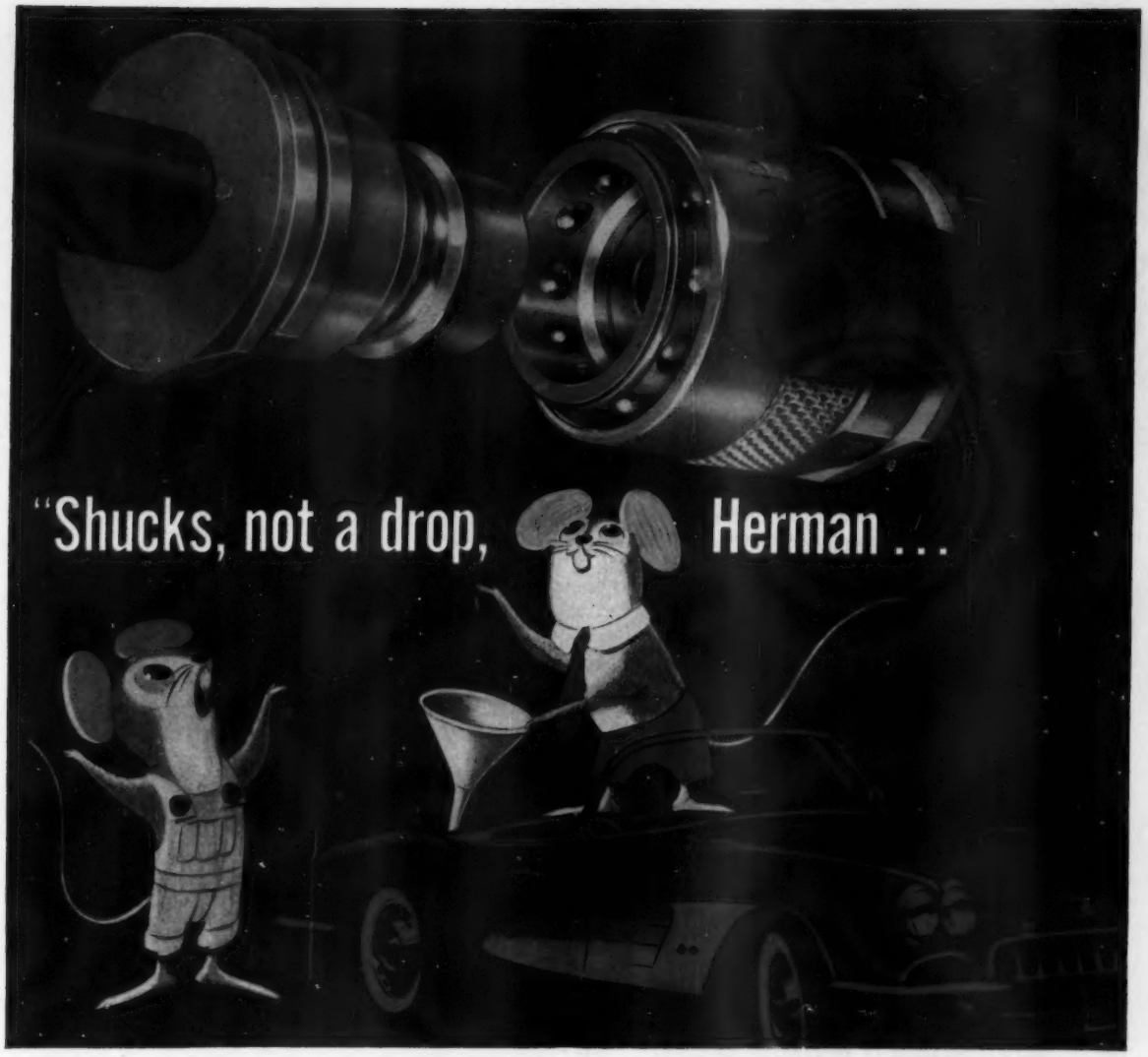
William I. Norman has been promoted to superintendent of operations of the Zanesville Works of the Armco Division, Armco Steel Corporation, Middletown, Ohio.

Eugene R. Mizer has been promoted to superintendent of maintenance and **Frank E. Darringer** to general foreman of the maintenance department.

Norman, who joined the company in 1929 after attending Muskingum College and Ohio State University, was formerly general foreman of maintenance. In his new position, he will have responsibility for all operations, including maintenance.

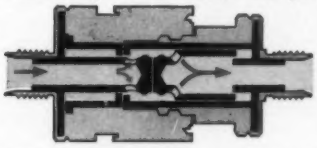
Mizer has succeeded **August W. Ryan,** who has retired after 42 years of service with Armco. A graduate of the University of Cincinnati, Mizer became associated with the company in 1935 and for the last five years has been a supervising engineer.

Darringer was formerly foreman of the machine shop and millwrighting. He joined the company in 1929.

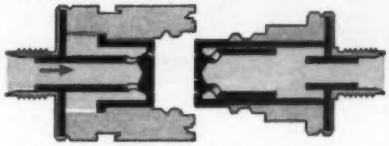


. . . it's a no-spill valved coupling by Snap-Tite!"

To use Snap-Tite Valved Coupling:



CONNECT—Full flow instantly



DISCONNECT—Stop flow instantly

The 15 Series valved coupling automatically snaps off the flow of the most volatile fluids when disconnected—with no leakage.

Snap-Tite's 15 Series valved coupling contains valves in both sections. Thus, the only fluid lost is that which clings to the outer metal surfaces. This coupling meets military specifications and can be used with fuels and other fluids to 3000 psi working pressure and 400°F. Sizes: 1/4", 1/2", 3/4", 1" in 6061T6 aluminum anodized; 3/8" in steel (electroless nickel plated), and 6061T6 aluminum.

Snap-Tite can provide the right valved coupling—with quick off-on action wherever coupling or shut-off is required—for most any use, most any fluid.

For more information, write for Snap-Tite Catalog #15. Snap-Tite representatives in all principal cities.

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For squirrel-cage, wound-rotor, and synchronous motors to 1500 hp

1. **Arc chutes** are easily removed for tip inspection, and all components can be quickly replaced if necessary.
2. **Pre-installed protective devices** save valuable installation time. General Electric circuit breakers are simple to reset, and CLF fuses can be quickly replaced.
3. **Completely wired and assembled** starter can be quickly installed. Simply connect incoming power leads and motor-control leads and motor can be put on line.
4. **Air-break contactors** have silver contact tips to give long operating life with a minimum of maintenance.

Write for bulletin GEA-6584 to Section 783-102, General Electric Company, Schenectady, New York.

LOW-VOLTAGE INDIVIDUAL STARTERS

General Electric's complete line of starters is . . .

Faster, less costly to

For individual or grouped control of motors up to 3000 hp

1. **Individual or grouped control** is obtained by installing 30-inch deep Limitamp starters as units or in lineups, mounted back-to-back or back-to-wall with a common power bus.
2. **Ample space for cable entry** is provided at top and bottom of unit. All installation wiring is made to conveniently located terminal boards.
3. **Hinged low-voltage panel** swings out for accessibility. Front-connected components are easy to maintain.
4. **High-voltage contactor** rolls out of enclosure. Low-voltage connections are plug-in type. Tip changing and a-c coil removal are fast and require a minimum of effort and tools.

For more information contact your G-E Apparatus Sales Office, or write for bulletin GEA-6331 to Sect. 783-102, General Electric Co., Schenectady, N. Y.

HIGH-VOLTAGE LIMITAMP* STARTERS

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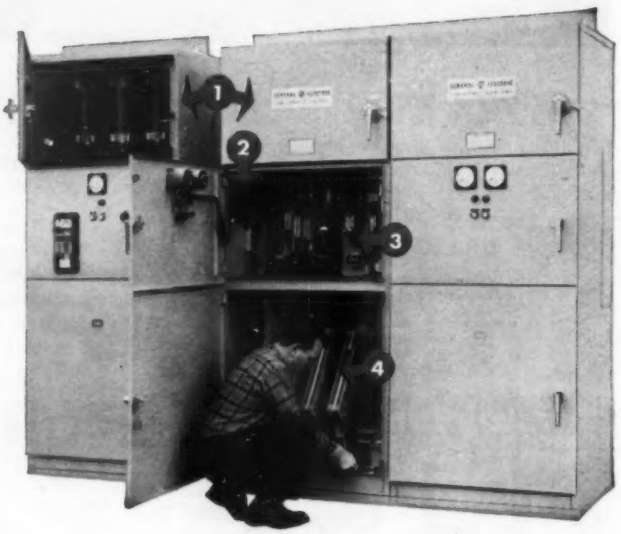

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LOW-VOLTAGE MOTOR CONTROL CENTERS

For flexible, grouped control of motors up to 400 hp

1. **All starter units in one structure** eliminates grouping of individual starter enclosures and associated installation expense.
2. **NEMA Class II construction** has factory-wired and tested interconnections. To install, simply connect power and outgoing motor-control leads.
3. **Front connected units** are accessible for speedy inspection and maintenance of wiring and components.
4. **Easily removable starter units** reduce bench maintenance time. Speed latches expedite unit removal; hold units in place when engaged. Components are readily accessible from top, front, and sides when starter unit is removed.

Write for bulletin GEA-4979 to Section 783-102, General Electric Company, Schenectady, New York.

install and maintain

LOW-VOLTAGE CABINETROL* POWER CENTERS

** Registered Trade-mark of General Electric Co.*

For custom-engineered grouped control of motors up to 900 hp

1. **Roomy starter compartments** facilitate routine inspection and maintenance without removal of starter unit from compartment.
2. **Custom engineered controls** are supplied to specific application needs. Complete system is factory-wired and tested. Installation requires only connecting incoming power and motor-control leads.
3. **Easily accessible components** are mounted with ample room for adjustment and maintenance. Spring-latch door provides easy access.
4. **Hinged, full-height rear doors** allow inspection and testing of continuous process equipment without stopping the process.

For more information contact your G-E Apparatus Sales Office or write for bulletin GEA-3856 to Sect. 783-102, General Electric Co., Schenectady, N. Y.

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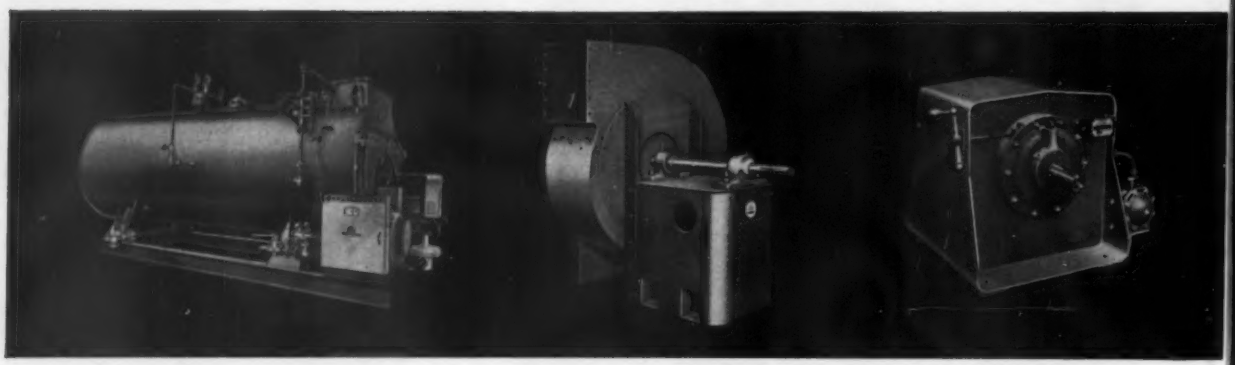

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Industrial fans with wheel types for handling air, gases, materials, shavings.

Fluid drives for stepless, adjustable-speed control of driven machinery.

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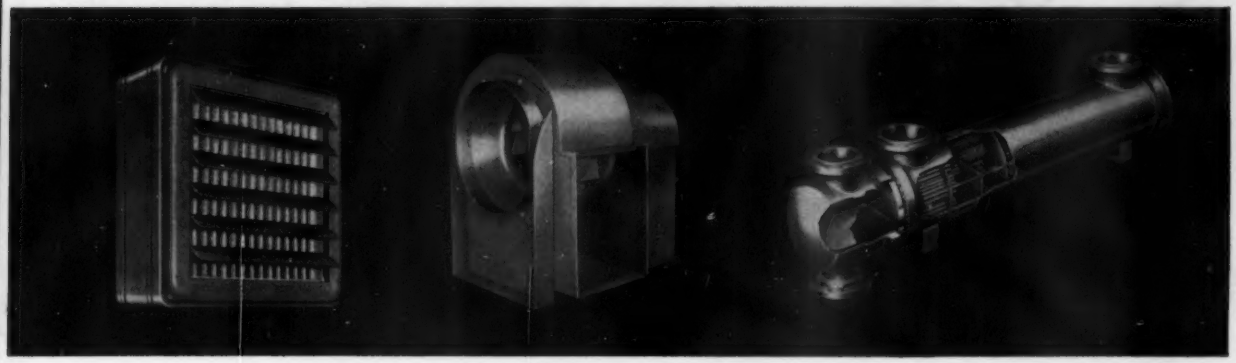
HERE'S WHY: You get *one-source responsibility* for quality and performance in equipment designed, engineered, and manufactured to work together. For, the new Industrial Division combines the engineering backgrounds and product lines of three American-Standard* divisions—American Blower, Ross Heat Exchanger, and Kewanee Boiler. There are engineer-staffed offices in all principal cities to work closely with architects, consulting engineers, and contractors. For complete information, contact the one nearest you. American-Standard Industrial Division, Detroit 32, Michigan. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.



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Heat exchangers, condensers, and feedwater heaters for every requirement.

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All Authorized SKF Distributors stock a large, diversified line of bearings—spherical, cylindrical, ball and tapered roller bearings—in countless sizes and variations. They offer you service, too, on bearings maintenance problems ranging from mounting to lubrication.

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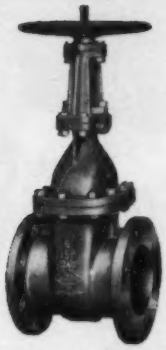

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you can see why it pays to

Specify JENKINS for STAINLESS STEEL Valves, too

This picture shows the many points of excellence in the design and construction of Jenkins Fig. 1327 Split Wedge Stainless Steel Gate Valves. Compare them with any valve you know. You'll conclude that it's hard to beat Jenkins at making valves, no matter what the material.

But no picture can show the quality of the castings . . . the precision machining . . . the rigid inspection and testing that have gone into this valve. All of these are as important as design and metal alloys in assuring long, dependable, economical valve service. And, all of them are up to the peak standards for which Jenkins has been known for almost a century.

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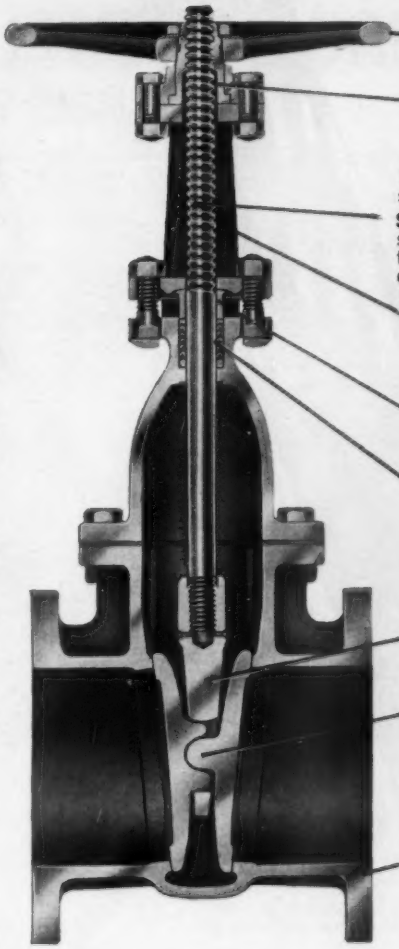

WHEEL of high strength malleable iron designed for firm grip and easy operation.

YOKE BUSHING, easily renewable. Made of bronze, for ideal thread engagement with stainless steel spindle, to prevent seizing or galling of spindle threads. Bushing of stainless steel is optional.

SPINDLE has long thread bearing surfaces with correct lead for easy, tight closing. Screws into wedge carrier, then secured by a stainless steel pin.

YOKE BONNET has liberal space between yoke arms for easy access to packing box. Precision machined flange face assures uniform contact with gasket for a tight body-bonnet joint.

GLAND consists of two pieces — gland flange and gland follower — eliminates binding of follower in case gland bolts are tightened unevenly.

PACKING of Chevron-type Teflon in large packing box prevents leakage. Only a minimum load is required on gland, extending service life of packing.

WEDGE CARRIER connects wedge to spindle and raises or lowers it. Husky in size to stand any operating strains.

SPLIT WEDGE is the ball-and-socket design which automatically adjusts to the tapered seating surfaces for positive shutoff. The discs, revolving freely in the wedge carrier, produce a self-cleaning action on seating surfaces and reduce possibility of galling and seizing.

BODY —Through-port design for full, free flow. Ample wall thickness and good design provide extra strength to withstand stresses. End flanges conform to M.S.S. specs.

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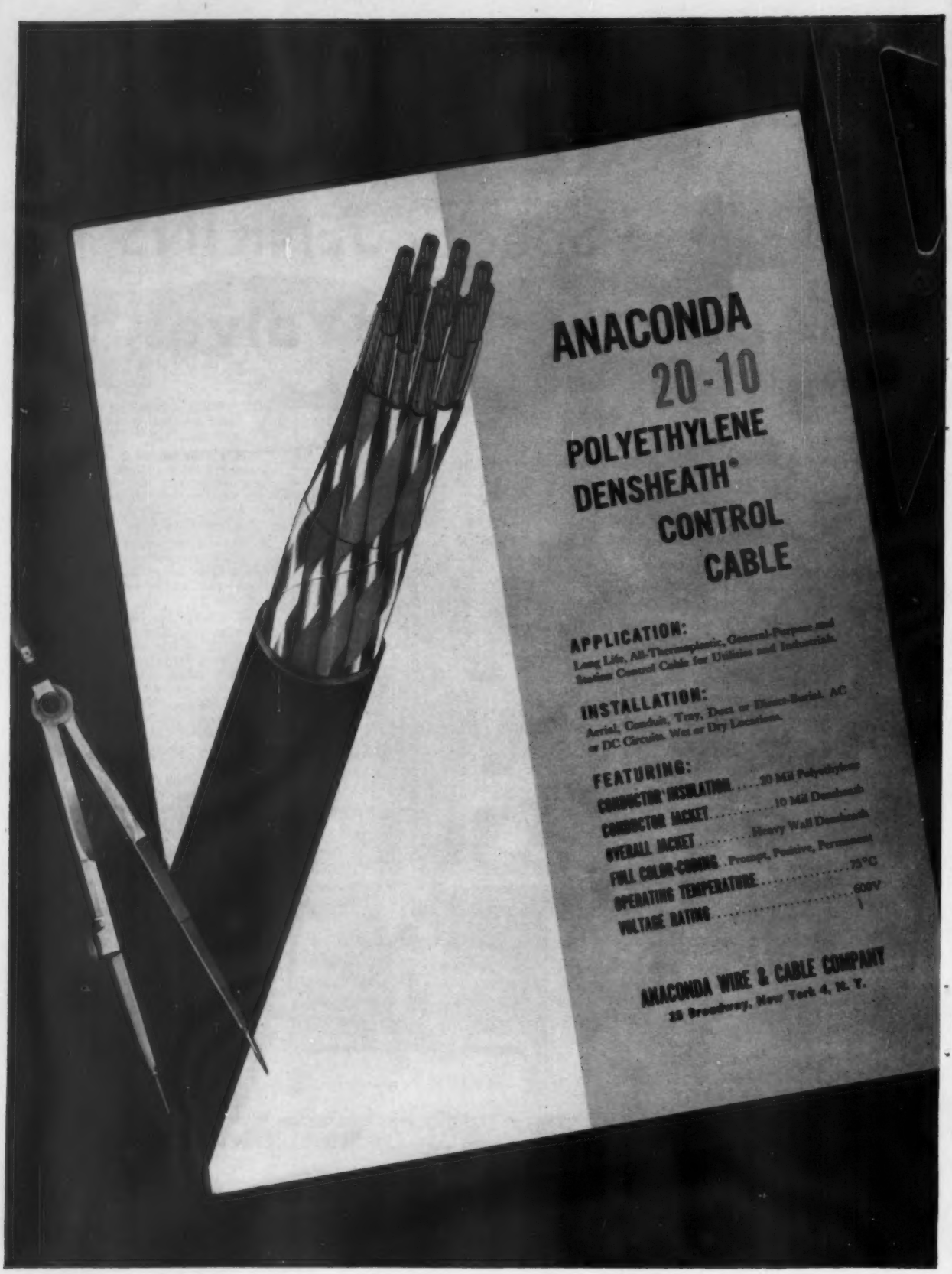
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20-10
POLYETHYLENE
DENSHEATH®
CONTROL
CABLE
APPLICATION:
Long Life, All-Thermoplastic, General-Purpose and Station Control Cable for Utilities and Industrials.
INSTALLATION:
Aerial, Conduit, Tray, Duct or Direct-Burial, AC or DC Circuits, Wet or Dry Locations.
FEATURING:
CONDUCTOR INSULATION ..... 20 Mil Polyethylene
CONDUCTOR JACKET ..... 10 Mil Densheath
OVERALL JACKET ..... Heavy Wall Densheath
FULL COLOR-CODING ..... Prompt, Positive, Permanent
OPERATING TEMPERATURE ..... 75°C
VOLTAGE RATING 600V
ANACONDA WIRE & CABLE COMPANY
25 Broadway, New York 4, N. Y.

ANACONDA OFFERS ONE CONTROL CABLE FOR PRACTICALLY ALL 600-VOLT APPLICATIONS: ANACONDA THERMOPLASTIC 20-10 CONTROL CABLE!

Polyethylene—Densheath* (PVC) construction provides superior features, makes possible new economies and improved service through standardization.

Anaconda—after testing a wide range of designs — recommends 20-10 Control Cable as today's superior all-purpose thermoplastic cable for 600-volt service. Here is a standard control cable for practically every 600-volt application —one that simplifies your ordering, stocking, installing, makes possible new economies in time and money.

Anaconda 20-10 Control Cable has been designed to meet all the exacting requirements for the highest quality control cable. Each conductor is insulated with 20 mils of polyethylene, then covered with 10 mils of Densheath (PVC). This construction combines the full IPCEA recommended insulation thickness (30 mils for 600 volts) with the flame retardance, excellent color coding and abrasion-resistance of PVC.

This composite design results in a control cable that can be used in virtually all 600-volt control applications. It can be installed aerially, in conduits, trays or ducts, and directly buried.

For 1000-volt rating, this same design is recommended, with the thickness of Polyethylene and Densheath (PVC) increased to 30 and 15 mils respectively.

Write for descriptive bulletin DM-5844 for complete technical details on Anaconda 20-10 Control Cable. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Reg. U.S. Pat. Off. 59226

ASK THE MAN FROM

ANACONDA®

FOR 20-10 CONTROL CABLE

ANACONDA WIRE & CABLE COMPANY
25 Broadway, New York 4, New York PE

Gentlemen:

Please send me a copy of Bulletin DM-5844 containing full technical information on Anaconda 20-10 Thermoplastic Control Cable.

Name.....

Company.....

Address.....

City.....Zone....State.....

For more facts circle 510 on Reply Card

from the . . . HORSE and BUGGY" DAYS

• Shown at left is one of the first portable boilers. This was a horse drawn combination boiler and steam engine built in sizes from 6 to 20 horsepower and popular during the 1860's.

from the Dobbin Drawn Portable . .

• As you can see, Erie City Iron Works has been in the boiler business a long, long time. Before the turn of the century we were building portable boilers similar to the horse drawn unit above. Simple in operation and rugged in construction, this type boiler gave many years of dependable service particularly in oil field and sawmill work.

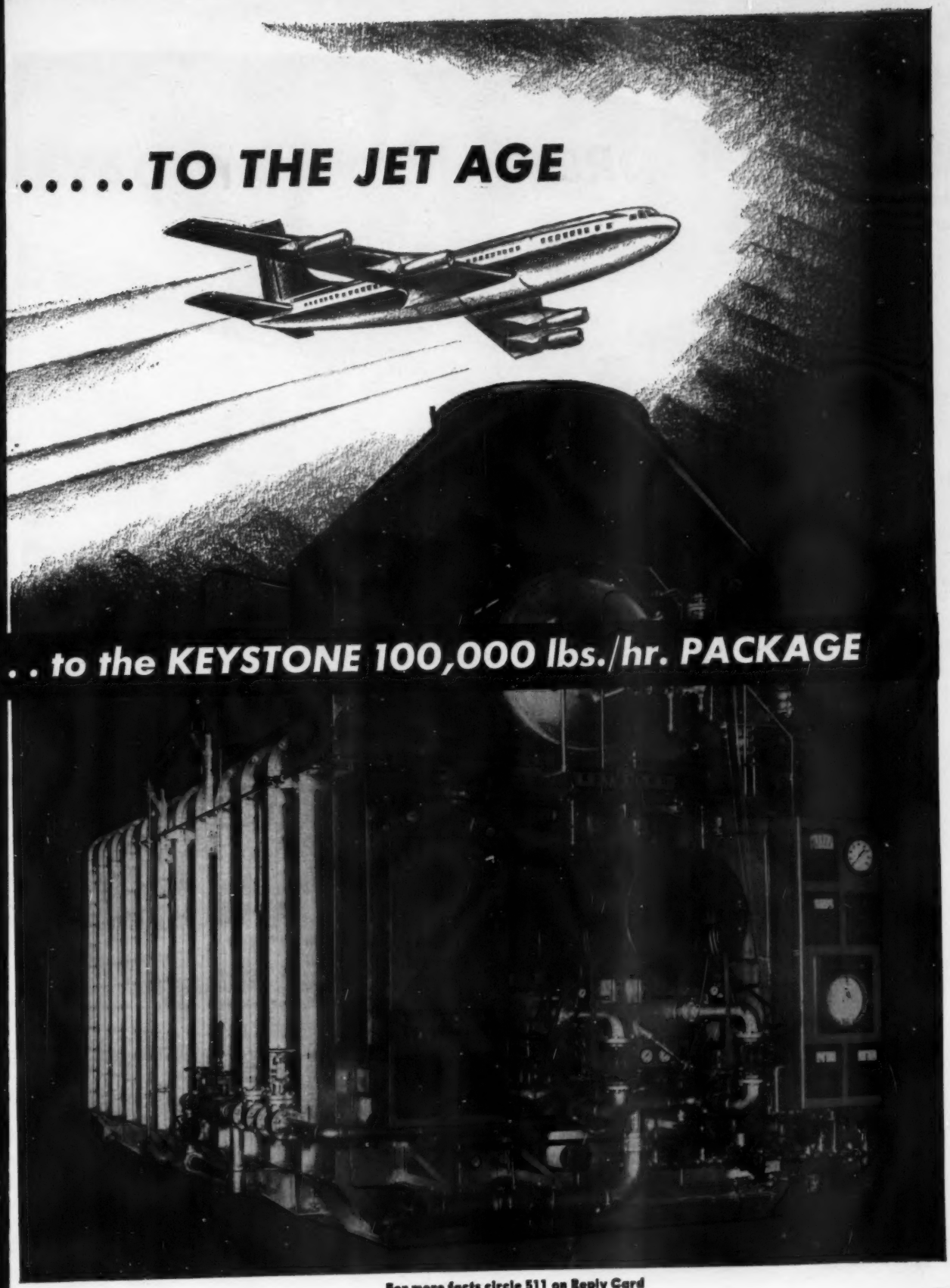
Today we build a complete line of firetube and watertube package steam generators from 1,700 lbs./hr. to the present 100,000 lbs./hr. unit shown at the right. This Keystone is a complete, modern package with burners and controls piped and wired prior to shipment. The natural circulation boiler is symmetrical in design with steel encased insulated side walls. No baffles, handholes or key caps are required on this unit. Maximum heating surface coupled with conservative ratings produce low exit temperatures and highest efficiencies.

Investigate the possibilities of renovating an antiquated, costly power plant with Erie City Keystone Steam Generators — modern as a Jet, rugged in construction and simple to operate. Write for bulletin SB-5993-G.

You can depend on ERIE CITY *Since 1840* *for sound engineering*

ERIE CITY IRON WORKS · Erie, Pa.

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
WASTE HEAT BOILERS • FIRE and WATER TUBE PACKAGE BOILERS
OIL and GAS BURNERS • STOKERS • PULVERIZERS


.....TO THE JET AGE
. . to the KEYSTONE 100,000 lbs./hr. PACKAGE

GENERAL CONTRACTORS: Campbell Construction Co., Detroit, Mich.
ARCHITECT & ENGINEERS: Campbell Engineering Co., Detroit, Mich.
ELECTRICAL CONTRACTOR: Southeastern Electric Co., Detroit, Mich.

Electrical Protection goes MODERN *with* BUSS Fuses in the Hoover Tool & Die Co., Centerline, Mich.

This new industrial plant on the outskirts of Detroit illustrates that the modern trend in electrical protection is to fuses. The main switch gear is a 1600 ampere pressure switch protected by BUSS Hi-Cap fuses. The distribution panels, both power and light, are equipped with FUSETRON dual-element fuses.

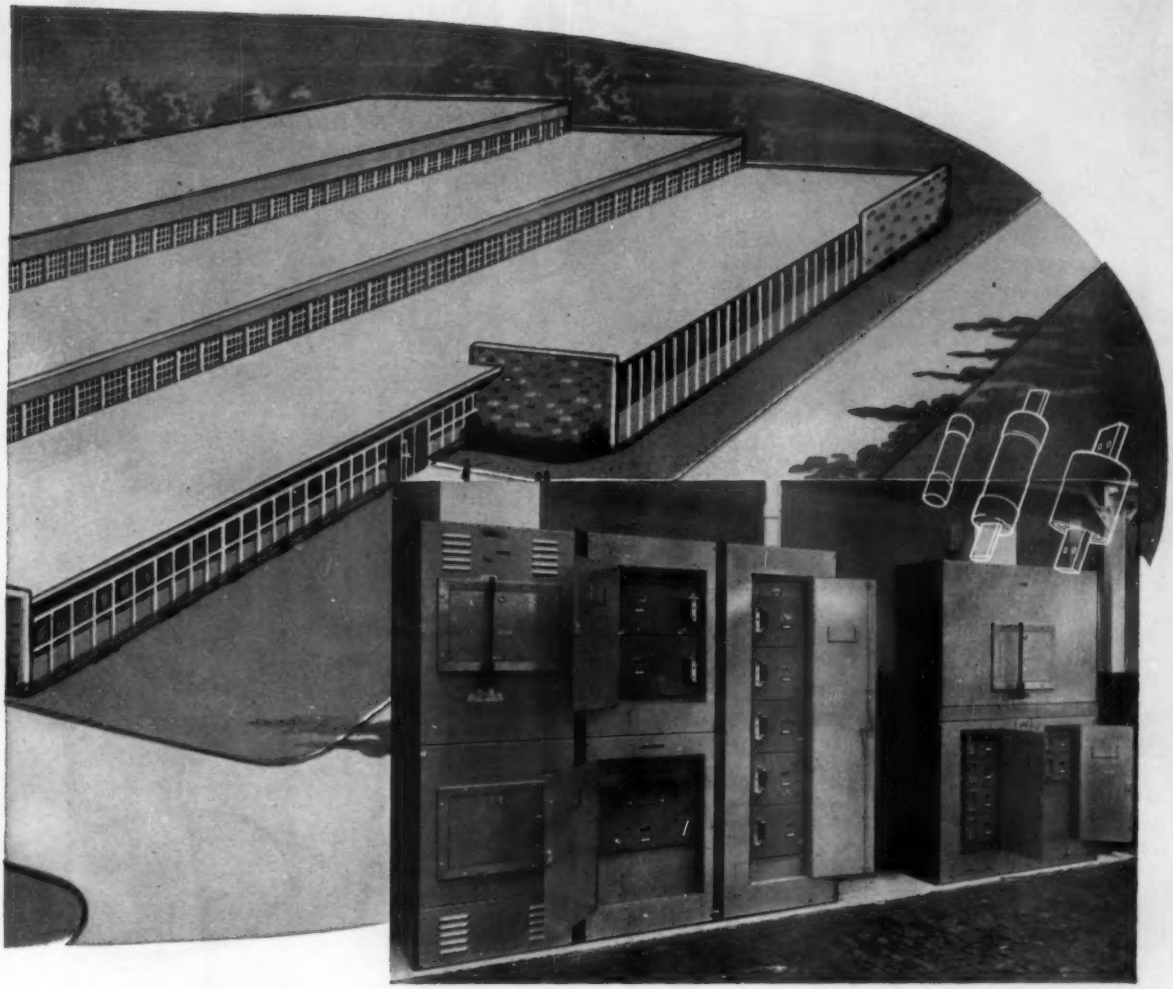
This plant will have many operating advantages because fuses are installed. *For instance:*

Future expansion without sacrificing safe protection.

Provisions were made to install a second 1600 ampere pressure switch when needed. This additional capacity and any increase in available fault current can safely be handled by BUSS Hi-Cap and FUSETRON dual-element fuses.

The interrupting rating of BUSS Hi-Cap fuses is 200,000 amperes rms symmetrical — and for FUSETRON fuses it is 100,000 rms symmetrical.

ANOTHER BUSS HI-CAP AND FUSETRON FUSE INSTALLATION



Main Power Panels —
BUSS Hi-Cap and FUSETRON Fuses

Through the year's savings result from the greater dependability of fuses.

Unlike mechanically operated devices, a fuse has no hinges, pivots or contacts to stick or get out of order. Dust, fumes, corrosion or age cannot increase a fuse's capacity or lengthen its blowing time.

After years of service, a fuse will give the same safe, dependable protection if called upon to open as it would have given on the day it was installed.

The dependability of BUSS Hi-Cap and FUSETRON fuses helps to reduce costs — by preventing damage and loss due to electrical faults — by being maintenance free — by requiring no periodic inspections — and by eliminating shutdowns caused by needless outages.

Is it any wonder then that "ELECTRICAL PROTECTION IS GOING MODERN WITH FUSES"? No other type of protective device can match the combined high-interrupting capacity, dependability and maintenance-free features of fuses.

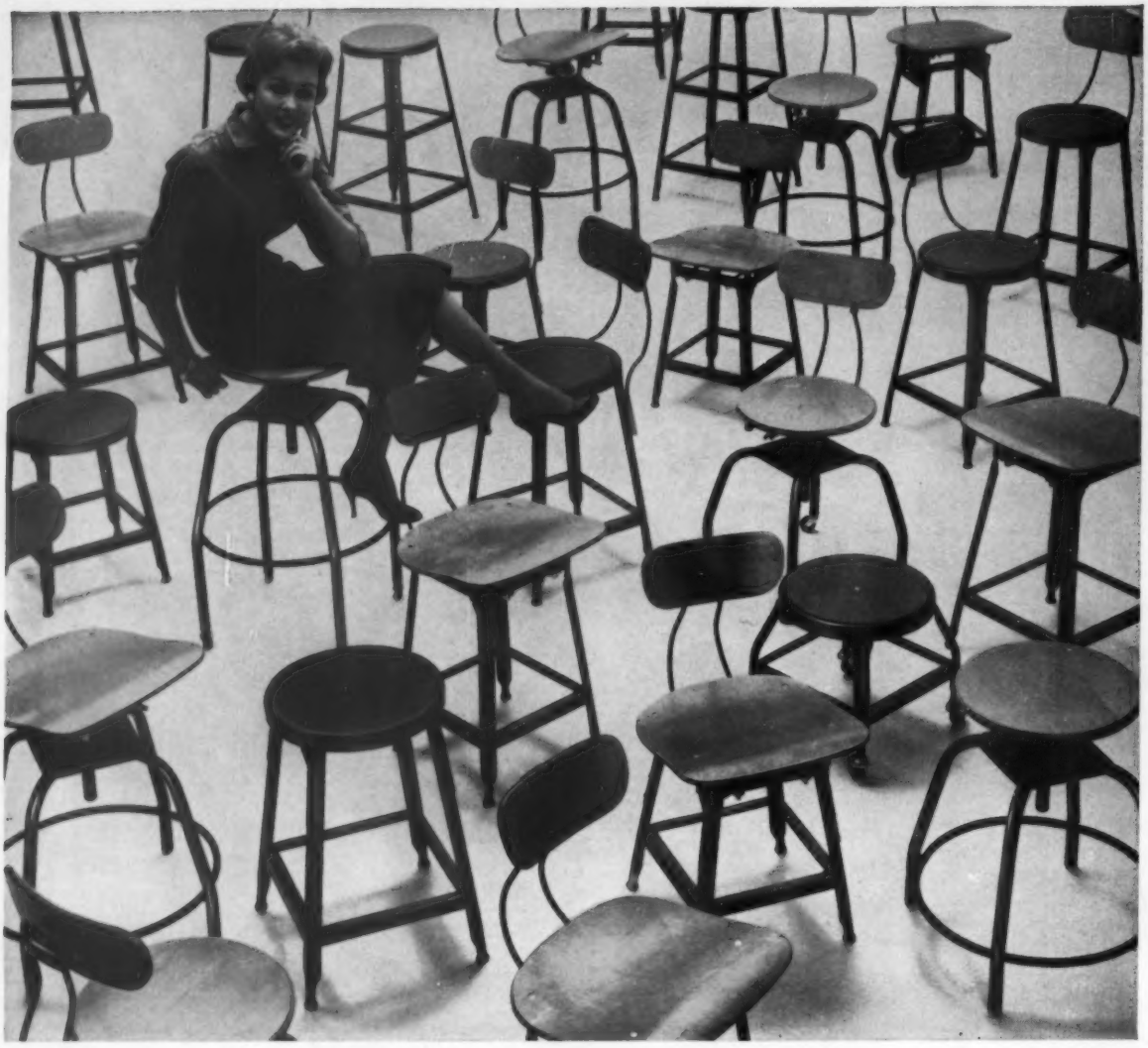
For more information

On BUSS Hi-Cap *fuses . . . . Write for bulletin HCS*

On FUSETRON
dual-element *fuses . . . . Write for bulletin FIS*

BUSSMANN MFG. DIVISION, McGraw-Edison Co. ST. LOUIS 7, MO.

For more facts circle 512 on Reply Card



Expect help from Hallowell in any sit-uation

Hallowell—one of your top-ranking sources for work benches, shop desks, tool stands and shelving —also makes chairs and stools for just about every job in your plant.

Talk about choice! There are chairs and stools with fixed or adjustable-height steel legs; tubular or channel legs; legs tipped with rubber or rubber with steel glides. Make a sit-down test. There are seats of steel, steel topped with Presdwood, seats round or contoured, fixed or adjustable in height; revolving or stationary. Lean comfortably against steel or plywood backrests, clamped or hinged.

Select from posture or regular models. All Hallowell chairs and stools are of sturdy construction with baked-on enamel finish.

And as a last comfortable touch, there are Hallowell covered foam rubber cushions for seats and backrests.

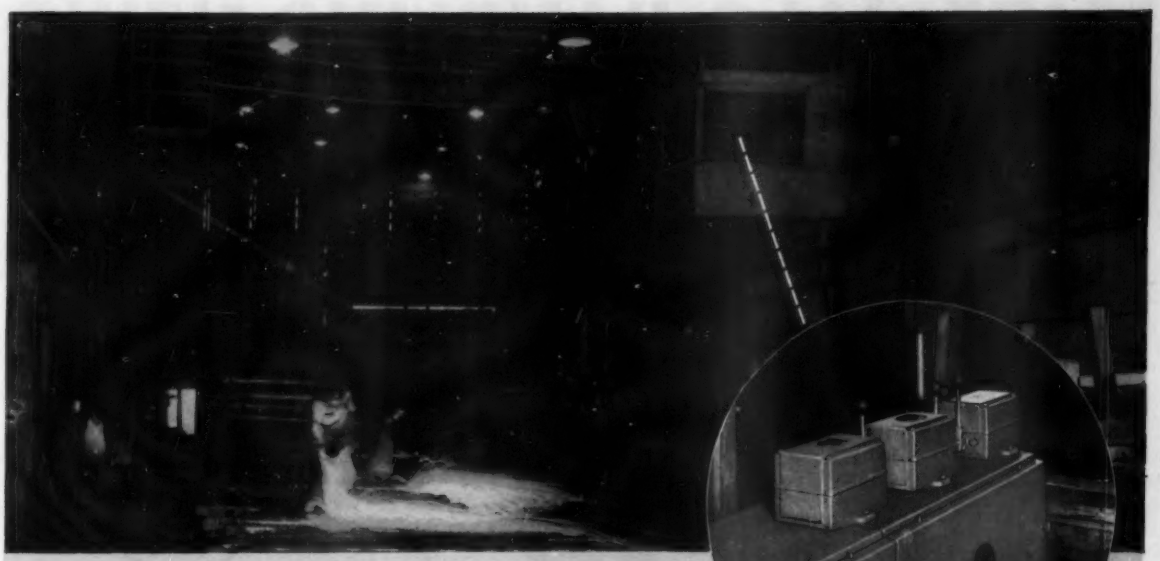
Write for complete information to Columbia-Hallowell Division, SPS, Jenkintown 26, Pa., or SPS Western, Santa Ana, Calif.

SPS

Jenkintown • Pennsylvania

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co. • The National Machine Products Co. • Nutt-Shel Co. • SPS Western • Standco Canada, Ltd. • Unbrako Socket Screw Co., Ltd.

For more facts circle 513 on Reply Card



MODERNIZE DC Cranes with EC&M "PT" Magnetic Control

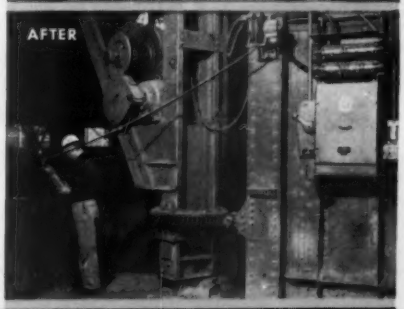
Three-motion crane serving scarfing area in mid-western steel plant uses "PT" control for bridge, trolley and hoist motions. EC&M Tab-Weld resistors are mounted on bridge foot-walk. Two "PT" controllers, replacing manual controllers, are mounted at front of cab. Third controller is at rear of cab, and all three master switches are up front within easy reach of operator. Since converting to "PT" control, there is more room in cab.

Is *manual* control penalizing crane operation in your plant? Are motors and machine subjected to abnormal conditions during acceleration and plugging? Is output affected by the slower reaction of operators as they tire under the strain of manual control on an all-day's run?

EC&M "PT" Magnetic Control erases these deficiencies. Timed acceleration and rectifier-plugging protection cuts motor abuse. Compact, easy-operating master switches provide a new "feel", enabling the operator to increase output.

The illustrations shown here are typical of the acceptance of EC&M "PT" control for DC Cranes. One plant has a modernization program under way involving dozens of cranes. Physically, "PT" control occupies about the same space as manual control. The cost is comparable, too.

Convert now to "PT" control. This *magnetic* control is far superior to manual control.



Jib crane, shown at top with old manual controller, is now operated by "PT" magnetic control (bottom). Pendant pushbutton provides remote control, gives operator better view of open hearth floor. "PT" control can be operated, without change, by either master switches or pendant pushbutton. "PT" control is front wired, front accessible, for mounting against walls or crane girders.

Write for complete details on "PT" crane control. Ask for Bulletin 6131.

2950

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

WHEREVER ELECTRICITY IS DISTRIBUTED AND CONTROLLED

For more facts circle 514 on Reply Card

MATERIALS-HANDLING NEWS

NEW AND UNUSUAL APPLICATIONS OF BASSICK CASTERS THAT MIGHT BE ADAPTED TO YOUR HANDLING PROBLEMS

Missile on casters. Nike-Hercules near end of final assembly line, as specialists install cable for guidance system at plant.

Casters give important savings in all industry and business

Following the lead of heavy industry, many light industrial firms, warehouses, and even retailers are finding reduced operating costs via streamlined materials-handling.

Casters have kept pace. Recent Bassick developments in addition to the H68 casters shown below include:

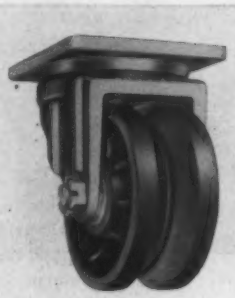
A light duty Floating Hub caster with a shock-absorbing, spring-controlled wheel designed to accommodate loads from 50 to 150 pounds. The "B-Line" of 4", 5" and 6" sanitary casters designed for easy cleaning. These are ideal for use in food processing, bottling plants, restaurants, bakeries . . . anywhere cleanliness is important.

Medium light duty Series H68 casters with two level ball bearing swivels, are ideal for industrial, warehouse and store applications. All exposed metal surfaces are zinc plated. Long service life.

Distributors Stock Casters

Local industrial distributors who handle Bassick casters carry most popular models in stock, can deliver promptly. They can recommend the most efficient casters for your specific job. And where necessary, they may call in a factory representative for engineering recommendations or special caster designs. All of which makes your local Bassick distributor a handy man to know. 9.57

CASTERS AID AUTOMATION OF MATERIALS-HANDLING



For inverted angle iron tracks: Bassick grooved wheel casters effect amazing reductions in handling costs. Light, medium, heavy and super-heavy duty models.

For heavy duty dragline truck systems: Bassick Series "S99" casters combine the advantages of strength (heavy gauge steel) with light weight and economy. Sealed bearings optional.

On display at the Materials-Handling Industry's Triennial Convention in Cleveland, this year, will be in-floor dragline systems, overhead chain belt pulleys, tractor pulled truck trains, monorail and dual track set-ups.

These and other advances toward the automation of materials-handling are increasing throughout heavy industry. Here labor traditionally accounts for the bulk of operating costs and labor-saving devices are constantly being sought.

Casters that can take relatively high speeds and abuse of such power-pulled applications have also been developed over the years. Shown here are some of the specially designed Bassick casters with features that suit them for automatic and semi-automatic handling systems. Because of their widespread acceptance, these are now standard casters in Bassick's line and are available through local industrial distributors who handle Bassick casters.

For power-drawn truck trains: Bassick Trailer Duty casters with heavy duty semi-steel or Bassick "Oncore" wheels (shown) will take the abuse of rough floors, high speeds. Milspec and "Floating Hub" models also available.

Rocket parts on castered carts save handling time, money

At this California aircraft plant, "A" frame carts, riding on Bassick casters, bring rocket turbo pump parts to the job. Top plastic shelf alone holds 100 small parts, larger components hang from sides of the cart on metal pegs.

Time saving here over separate handling of 150 components is tremendous. Parts carts on casters might cut costs for your plant, too.

THE BASSICK COMPANY
BRIDGEPORT 5, CONN.
IN CANADA:
BELLEVILLE, ONT.

Sweet's

Symbol of SW Excellence
Bassick
A DIVISION OF
STEWART-WARNER CORPORATION

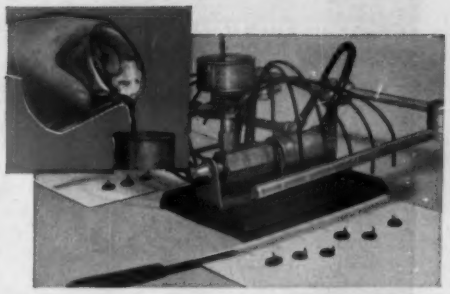
For more facts circle 515 on Reply Card

For more facts circle 516 on Reply Card →

Bertsch & Co. finds solution to lubrication problem... with Standard Oil's

RYKON Grease R

Centralized lube system pumps grease through 80 ft. lines in cold temperature; no clogging



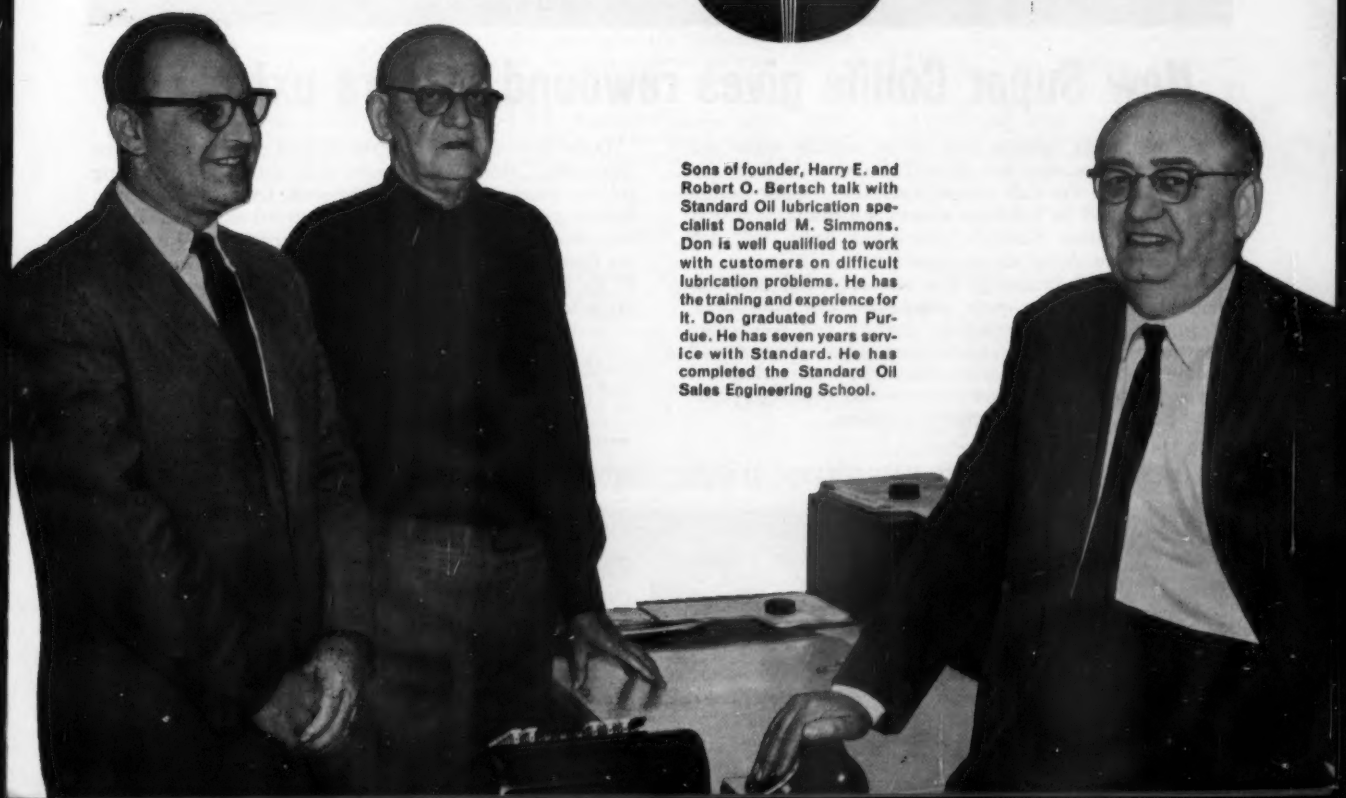
Lab demonstration shows how RYKON Grease R works. Grease is poured into reservoir as a fluid. The shearing action exerted by pump and outlets irreversably converts fluid to a grease. Grease is ejected from outlet lines.

Problem: Bertsch & Company, Cambridge City, Indiana, makes pinch rolls and other metal bending equipment. A centralized lubrication system used on one pinch roll model had to pump grease 80 feet. Greases tried could not be pumped this distance without clogging lines. Since machines are shipped all over the world and are often in operation in cold climates, Bertsch had additional problems. The grease had to be pumpable in cold temperatures. It had to be foolproof so that customers beyond the reach of service calls would experience no problems.

What was done: Bertsch turned to Standard Oil for help. Standard Oil man, D. M. Simmons had the answer: RYKON Grease R. This is a rheopectic grease, one that flows like an oil. Its rheopectic properties cause it, under slight shearing stresses, to turn to a thick, durable grease. RYKON Grease R flows to the pump as a fluid, lubricates the bearings as a grease.

What you can do: Maybe you manufacture equipment that needs a centralized lubrication system and you have been looking for a grease like RYKON R. Get the facts about RYKON Grease R from your nearby Standard Oil lubrication specialist anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*



Sons of founder, Harry E. and Robert O. Bertsch talk with Standard Oil lubrication specialist Donald M. Simmons. Don is well qualified to work with customers on difficult lubrication problems. He has the training and experience for it. Don graduated from Purdue. He has seven years service with Standard. He has completed the Standard Oil Sales Engineering School.

New Super Coilife gives rewound motors extra life

Moisture, acids, alkalis and other contaminants are locked out once and for all with Super Coilife epoxy encapsulation. For full motor protection, Super Coilife can be applied to random wound stators, rotors and armatures. Super Coilife's mirror-like finish will not crack or craze under severe operating conditions.

Because of its unusually low viscosity, this new solventless epoxy completely penetrates the interstices, through the slots, thoroughly coating and protecting the windings. Since 1953, when Westinghouse introduced Coilife* epoxy encapsulation, research, engineering and development have evolved this new and improved product—Super Coilife, an exclusive process.

Only Westinghouse Repair Plants can give the right "thin-wall" thickness for each type and class of winding to give maximum heat transfer away from the windings. Before you send out your next rewind call your Westinghouse representative for the complete story or write for Booklet B-7622: Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa.

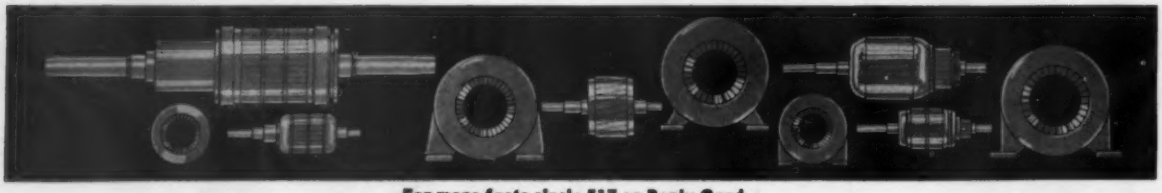
*Trade-Mark J-95197-A

YOU CAN BE SURE...IF IT'S

Westinghouse

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV MONDAYS

USE WESTINGHOUSE MODERN MAINTENANCE SERVICE... SHOP REPAIRS... RENEWAL PARTS... FIELD SERVICE



For more facts circle 517 on Reply Card

BULLETINS just released and of immediate plant interest

CONSTRUCTION

101 For Lower Building Costs—Evidence that industrial and other buildings can be erected fast and at low cost without sacrificing quality or durability is presented in this 20-pp booklet. Illustrates and documents nearly 20 buildings of various type utilizing company's pole-type construction. Basic details of this construction are also covered. Wood Preserving Div., Koppers Co., Inc.

102 Why Sandwich Walls—Advantages of aluminum sandwich walls, field assembled with welded studs, are described and pictured in this 18-pp brochure. Shows a number of such curtain walls and cites low first costs, speed of assembly, high insulating efficiency. A chart lists types of wall recommended for various conditions. Nelson Stud Welding Div., Gregory Industries, Inc.

103 Overhead Doors—Barcol cam action overhead doors and electric door control are presented in this 16-pp illustrated catalog. Gives information on Weather-King flush sections combining high-insulation-value sandwich construction with weatherproof facing. Panel doors, electric operators, radio controls and special controls are also shown. Specifications and instructions for preparing building openings and installations of various models are given with detail drawings. Barber-Colman Co.

104 Grating and Threads—Safety, visibility, permanence and easy maintenance are among advantages of open flooring discussed in 28-pp Bulletin 2527-R. Covers use of electroforged grating in a wide range of industries; also features grating applications in sidewalks, locks and dams, sewage treatment plants. Information provided includes types and spacing, bearing bar surfaces and weights, fastening methods, and safe loads for electroforged carbon steel and aluminum interlock grating. Blaw-Knox Co.

MATERIALS HANDLING

105 Low Head Hoists—Described in 32-pp Catalog H-59 are Lo-Hed electric hoists, designed to save an average of 1 ft of ceiling height in new plant construction, or add 1 ft of lifting height in existing plants. In addition to presenting five classes of monorail Lo-Heds for loads from ¼ to 12 tons, this book tells to consider in buying a hoist and how to select one according to needs. Provides information on types of controls, hoist suspension, mounting. American Engineering Co.

106 For Overhead Handling—Illustrated and described in Bulletin M-33 is a typical plant using company's Trambeam for overhead handling of materials. Advantages and features are detailed. Whiting Corp.

107 Industrial Casters—Catalog 159 contains 24-pp of illustrations, descriptions and specification data on swivel-plate and rigid-plate truck casters for industrial applications. Includes detailed information on spring-action casters, V-grooved casters, grease-sealed casters, scaffold casters, floor truck locks, industrial wheels, and others. Faultless Caster Corp.

108 Multi-Purpose Dumper—Described in this 8-pp catalog are vertical, senior, junior and hydro dumpers. Pictures show applications of dumpers in various industries, and illustrate how the equipment can be adapted to handle bags, boxes, bulk and drums. Specifications and dimensional drawings are included. Essex Conveyors, Inc.

VALVES, PIPING, FITTINGS

109 Jacketed Valves—Bulletin 3 describes Aloyco 150- and 300-lb fully jacketed stainless steel valves designed for fluids difficult to move at room temperatures. Sectional views show gate, globe and check valve designs illustrating extensive jacketing which includes bonnet areas. Teflon disc designs are also described. Alloy Steel Products Co., Inc.

110 Non-ReturnValve—Featured in 6-pp Bulletin S-2 are of single acting non-return valves for control of boiler pressure. Advantages of design and operation are detailed, and schematic diagrams showing component features are included, as well as complete specifications. Golden Anderson Valve Specialty Co.

111 General Purpose Valves—Catalog KS-1 covers the company's small valves for general application. Information pertaining to working pressures, specifications, construction features, and suggested applications is included. Kerotest Mfg. Co.

112 Three-Way Valves—Bulletin 8F describes three-way feedwater heater bypass valves for regulating boiled feedwater flow. Includes sectional drawings and information on design features, materials of construction, operation and application, as well as piping diagrams. Schutte and Koerting Co.

113 Pipe Data—Technical Data Card TDC-191 contains the dimensions and weights per foot of pipe in sizes ⅛ through 36 in. for all schedules. Tublar Products Div., The Babcock & Wilcox Co.

114 Steel Water Pipe—Form P. O. 8859, on welded steel water pipe, treats such subjects as wide range of diameters and wall thickness, durability, high flow capacity, high strength and field fabrication. Includes information on standard and special fittings, joints. Armco Drainage & Metal Products.

115 Piping Products—Use of this company's couplings, fittings and other piping products is described in 8-pp Form 259. Contains product information, installation instructions, specifications, illustrations of such applications as fuel and supply lines, materials handling piping, equipment piping, pump settings. Dresser Mfg. Div., Dresser Industries, Inc.

116 Steam Specialties—Twelve-pp Bulletin 203 discusses and illustrates valves, thermostatic traps, float and thermostatic traps, steam traps (250 psig maximum pressure as well as blast and high pressure) and pipeline strainers. Dimensions, capacities, patterns, weights and accessories are highlighted. Outstanding features of the valves, floats and traps, their construction and operation, are explained. American Air Filter Co., Inc.

On pages 185-186 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

117 Stainless Steel Fittings—Light-wall stainless steel fittings and flanges for non-critical process piping are described in this 6-pp bulletin. Illustrations show methods of joining light-wall fittings and pipe, including a sequence of photos on making "rolled in" flanged assemblies. Tube Turns, Div. Chemetron Corp.

118 Seamless Welding Fittings—Bulletin FB-78 is a 12-pp guide to material selection of carbon, alloy and stainless steel welding fittings and flanges. Covers specifications and analyses, effects of alloying elements, mechanical properties and arc welding procedures. Tublar Products Div., The Babcock & Wilcox Co.

PUMPS, COMPRESSORS

119 Rotary Pumps—Described in this bulletin are company's Series A internal gear rotary pumps for transferring a variety of liquid types in low medium viscosities. High- and low-speed models are available and pumps can be supplied in four constructions. Bulletin provides performance data and dimensions, drive assemblies. The Wayne Pump Co.

120 Condensation Pumps—Four types of vacuum return line condensation pumps for heating systems are described in 12-pp Catalog J-200. Horizontal and vertical models with standard and special capacities are described. Catalog contains typical specifications, dimensions, installation diagrams and cutaway three-dimen-

BULLETINS

(Begins on page 23)

sional drawings illustrating the pumps' operating characteristics. C. H. Wheeler Mfg. Co.

121 **Gear Pumps**—Bulletin G-1 describes gear pumps designed for a variety of difficult pumping applications. Cutaway view illustrates construction and operation details and tables give dimensional data. Schutte and Koerting Co.

122 **Turbine Pump Motors**—Featured in 8-pp Form F-1975 is a vertical pump motor designed for short-coupled pumping service. Cutaway views showing component details are included, and advantages of design and operation are discussed. U.S. Electrical Motors Inc.

124 **Packaged Compressors**—Bulletin 158, 28-pp, presents advanced design and operating features of company's Model CFA packaged field compressors. Specifications are provided for complete line of two- and four-compressor models built in 15 sizes 100 to 350 bhp. Clark Bros Co.

MECHANICAL POWER TRANSMISSION

126 **Power Transmission Digest**—Eight-pp Bulletin A-706 presents a brief but comprehensive review of manufacturer's line of power transmission machinery. Featuring Flexidyne dry fluid drives and Para-flex flexible cushion couplings, bulletin also shows such Taper-Lock products as steel conveyor pulleys, roller chain drives, shaft couplings and Dyna-V belt drives. Dodge Mfg. Corp.

127 **Power Transmission Equipment**—Featured in 48-pp Book 2747 is a line of gearmotors, motogears and fluid drives for power transmission applications. Advantages of design and operation are detailed, and comprehensive selection tables are included, as well as photos, cutaway views and diagrams showing component features. Link-Belt Co.

128 **Sprockets, Roller Chains**—Comprehensive 88-pp Catalog 60 features complete engineering data on company's sprockets and chain drives. Profusely illustrated with photos and dimensional diagrams, catalog covers various types of sprockets and roller chains and includes detailed engineering tables. Cullman Wheel Co.

129 **Timing Belt Drive**—Described in Bulletin 20B8760 is a timing belt drive constructed with steel cable cords imbedded in Neoprene fully molded with a nylon base fabric. Allis-Chalmers Mfg. Co.

130 **V-Belt Pulleys**—Contained in this product bulletin are specifications on standard single-groove V-belt pulleys for fractional horsepower equipment. Dimensional diagrams included. The Nagel-Chase Mfg. Co.

131 **Wire Rope Blocks**—Twelve-pp Catalog Section I contains specifications, including tonnage capacities and recommended wire rope sizes, for Durolite blocks and sheaves. Stocked in sizes from 6 to 18 in. with bronze bearings and 8 to 42 in. with roller bearings, Durolites combine light weight with durability, offer capacities from 1-ton single blocks to 600-ton multiple assemblies. Special blocks are also illustrated in catalog. Sauerman Bros., Inc.

132 **Magnetic Brakes**—Bulletin 5000 illustrates and describes construction features and advantages of company's magnetic brakes covering the range of 600-series motors. Illustrates maintenance procedures, and contains selection charts for matching brakes to motors. The Electric Controller & Mfg. Co., Div. Square D Co.

133 **Roller Bearings**—Condensed Catalog 59A contains 34-pp of detailed information on self-aligning roller bearings. Designed to aid in proper selection of bearing equipment for greater speed, higher load capacities and longer life, catalog includes data on roller bearing design, specifications, lubrication, seals and installation features. Chain Belt Co.

DUST CONTROL

134 **Electronic Air Cleaner**—Sixteen-pp Bulletin 249-A describes Model B Rollotron, giving details of operation and electronic principle, and explanation of agglomerator and storage sections, capacity and dimension table, specifications. Typical installations are listed. Explains operating simplicity of the unit and why it requires little maintenance. American Air Filter Co., Inc.

135 **Dust, Fume Control**—Sixty plant installations are illustrated and described in this 52-pp catalog on dust and fume controls systems. Sections are devoted to systems for the ceramic, foundry, grain, metalworking, steel and woodworking industries, and as many types of dust and fume control are featured as possible. Special sections detail centrifugal collectors, unit collectors. Also covered are manufacturer's research and development facilities. The Kirk & Blum Mfg. Co.

136 **Space Filters**—Bulletin 1505-5 describes a space filter designed with high dust carrying capacity and replaceable filter elements. Construction features and advantages are illustrated in detail. Mine Safety Appliances Co.

ELECTRICAL

137 **Space-Saving Motors**—Eight-pp Bulletin GEA-6927 describes manufacturer's Thinline motor, rated 1 to 5 hp in dripproof and totally enclosed constructions for such limited space applications as machine tools, fans, blowers etc. Includes description of product features, chart of interchangeable flange dimensions. General Electric Co.

Reader Service Cards for ordering bulletins are on pages 185-186. Be sure to include your name, job title, and company, even if you want bulletins mailed to your home address.

138 **Motors and Drives**—Eight-pp Bulletin 2650 describes company's line of a-c and d-c standard motors, special motors, gear motors and adjustable speed drives, for a broad range of industrial applications. Summarizes characteristics and modifications for 20 basic types of motors and drives. The Louis Allis Co.

139 **Unit Substations**—Tranfo-Units—packaged, compact unit substations—are described in 16-pp Bulletin 5604-1A. Provides basic design, application and specification information of value in selecting integrated combinations of equipment. Consisting of transformer with primary and secondary switchgear, these units permit voltage step-downs at the load area. First section of bulletin covers general types of equipment available. Then separate sections are devoted to the unit's three main parts—incoming, transforming and outgoing. Ratings, dimensions, weights and outline drawings of 16 types of Tranfo-Units are provided in the fifth section; a fiinal section gives specifications. I-T-E Circuit Breaker Co.

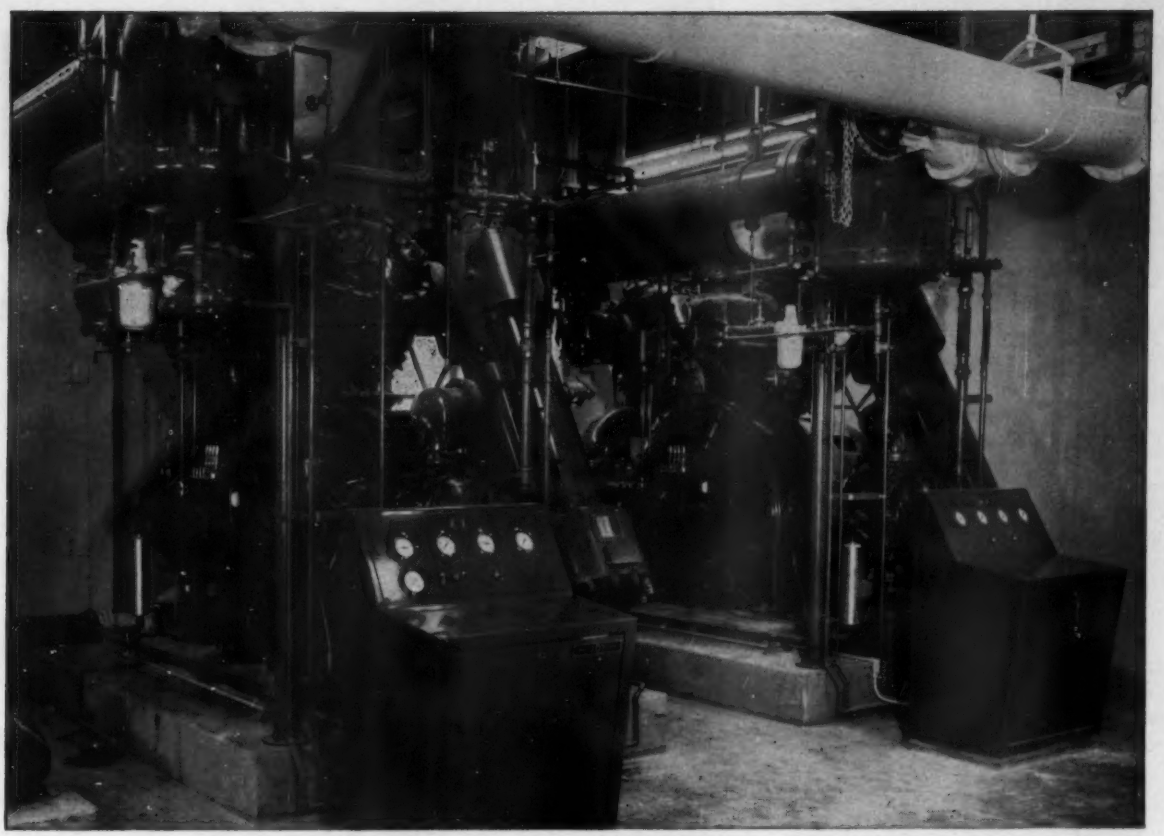
140 **Conduit and Fittings**—The technical section of 60-pp Bulletin 485 includes conduit specifications and other data for use in estimating and planning electrical installations, standard symbols and abbreviations for use on drawings, and applicable electrical data. ASA specifications for the various types of conduit and electrical metallic tubing are also reproduced, and brief illustrated description. I-T-E Circuit Breaker Co.

141 **Underfloor Distribution**—Design and application methods for an underfloor distribution system are detailed in this 8-pp bulletin. Features are illustrated and basic fittings shown. Conduflor Corp.

142 **Electrical Connectors**—In addition to providing an illustrated nomenclature of electrical connector terms, 12-pp Catalog B 73 lists electrical current ratings for cable, as based on wire gages and number of wires. Covers manufacturer's complete line, which includes oval push-pull, round push-pull, round push-latch, quick-lock, straight pin bigun, round push-lock, and changeout styles. Each is described and illustrated. Joy Mfg. Co.

143 **Capacitor Selection Guide**—Six-pp Folder GED-3687 gives tables for choosing proper ratings of switched shunt capacitors for modern induction motors. Tables cover motors of all standard types, enclosures and nominal speeds, 220 to 4000 v, 2 to 500 hp. General Electric Co.

(More Bulletins on page 187)



AIR POWER STRONG ENOUGH TO DESTROY METAL PARTS AT BOEING AIRPLANE CO.

In a special sonic test lab at Boeing's new developmental center in Seattle are a pair of air horns powerful enough to destroy the walls of Jericho. These horns are used to test things to destruction with sound waves as great as 170 decibels.

The horns are powered by two Joy WN-224 compressors of 400 horsepower each, delivering a total of 4800 cfm. Two important points were considered in the selection of these compressors . . . smooth-running characteristics, and size of the machine.

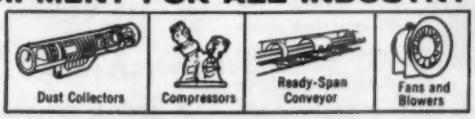
Much of Boeing's developmental center rests on foundation piles and 180,000 cubic yards of fill pumped from a nearby river. Since the WN-224 is inherently smooth running, the compressors required only a simple slab foundation —even on the filled ground.

As for size, the WN-224's were shipped as a package unit. This is possible because of the compressor's compact semi-radial design.

There are ten horsepower ratings of the WN-224, ranging from 350 to 1250 hp, 2400 to 7400 cfm. Get complete information on the WN-224, the smoothest running compressor in its field. Write for free bulletin 306-15.

WSW I 7839-306

AIR MOVING EQUIPMENT FOR ALL INDUSTRY

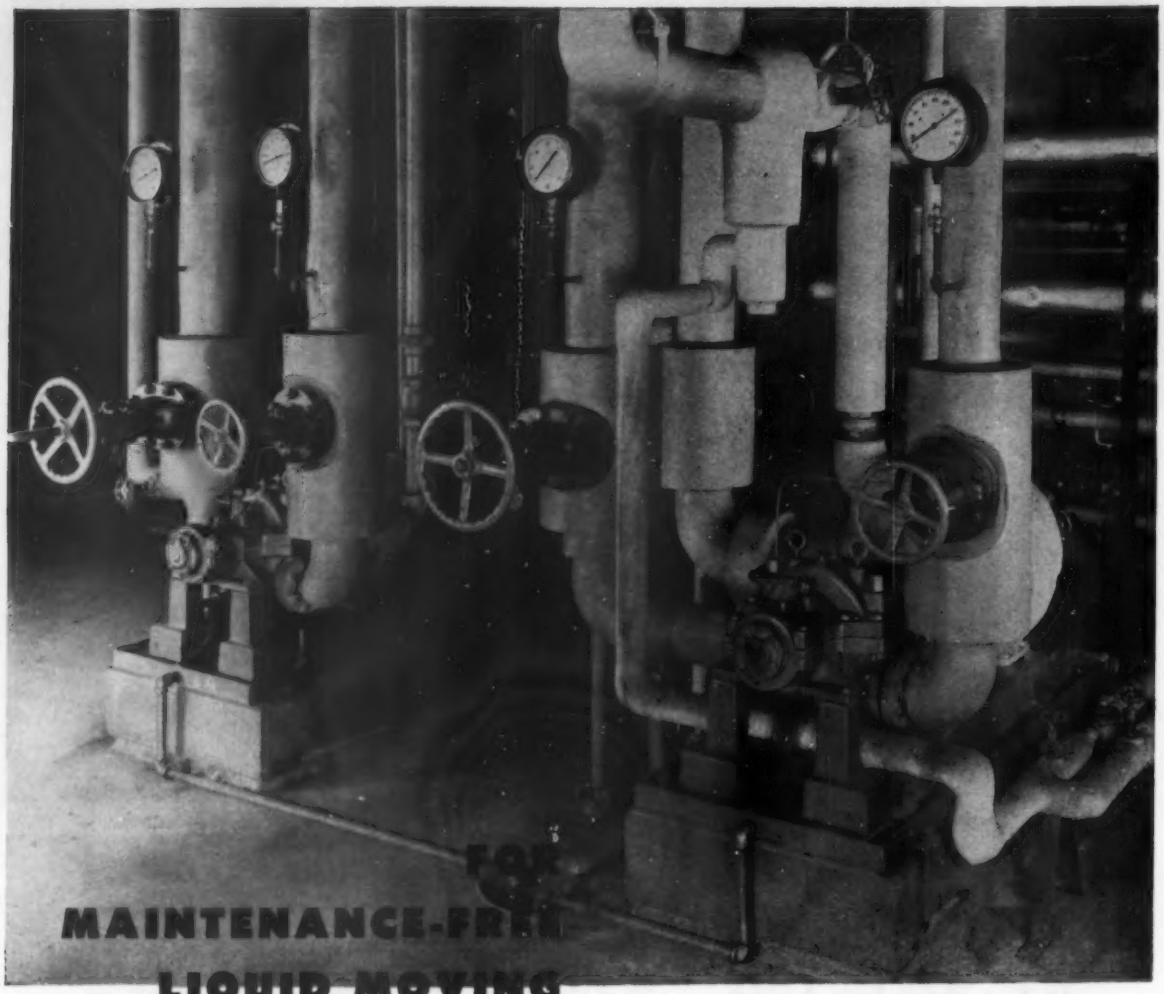


JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

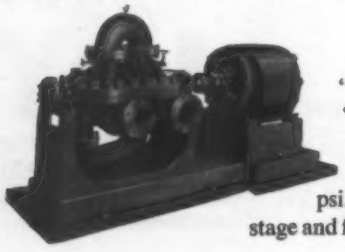
In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

For more facts circle 518 on Reply Card



"Buffalo" Class "RR" Pumps

For boiler feed and other high pressure, high temperature applications with clear water, "RR" Pumps deliver the utmost performance with an absolute minimum of maintenance. The unique "Buffalo" Class "RR" design is unsurpassed for consistent hydraulic balance. Rugged "Buffalo" construction features include efficient impellers — extra generous bearings and shafts — rigid casings with simply-formed passages to avoid friction losses — very deep stuffing boxes to accommodate more packing.



"Buffalo" Type "RR" Boiler Feed Pumps for pressures up to 500 psi. Available in two-stage and four-stage models.

These superior "Buffalo" design and construction features assure you of pumps that will stand up under continuous punishing service — that require practically no attention other than lubrication — that deliver more water at less cost for power.

The "Buffalo" Class "RR" Pump is your best buy for clear water service — hot or cold — against heads as high as 1500 feet — at capacities up to 900 gpm. Ask your nearby "Buffalo" engineering representative for full information, or write us for Bulletin 980-D.

"Buffalo" Pumps bring you the famous "Q" Factor — the built-in QUALITY that provides trouble-free satisfaction and long life.

BUFFALO PUMPS

"Buffalo" PUMPS

Division of Buffalo Forge Co.

166 Mortimer Street • Buffalo, N. Y.

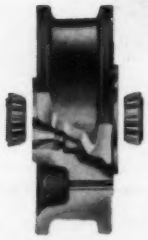
Canada Pumps, Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

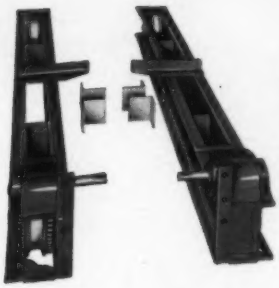
A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

For more facts circle 519 on Reply Card

It Costs Far Less to Build a Crane Locally from Wright Matched Components!



TREAD WHEELS
Made of special car wheel iron with the tread deep chilled to a hardness of 450-500 Brinell. Tapered tread is self-aligning.



END TRUCKS
Welded steel channel construction with heavy steel plate diaphragms. Squaring shaft of ground and polished steel.

CRANE DRIVE UNIT
Consists of electric motor and well-proportioned gear reduction. Solenoid "drag" brake. Size 1—motors up to 2 HP. Size 2—3 or 5 HP motor.

• Now, buy a dependable WRIGHT B-514 Top Running Single Bridge Crane the modern, money-saving way! Here's all you do! Instead of paying shipping costs on a complete crane, order only the matched components—end trucks, crane drive unit, trolley hoist—from the WRIGHT factory. Then, buy heavy I-beam structurals from a local source. This way you realize big savings by greatly reducing freight charges. In addition, WRIGHT also furnishes you with detailed plans for assembly, including a list of essential structural components to be bought locally.

A FEW OF THE WRIGHT B-514 FEATURES:

Controls • Single-speed push button controls are furnished with fluid-drive models, variable-speed push button controls with models without fluid drive. Variable speed controls have five selective speeds for speeding and slowing crane travel.

Fully Integrated Electrical Controls for the B-514 assembled locally with a WRIGHT Hoist and WRIGHT Crane Drive Unit are factory-installed at no extra charge.

Two Timken Roller Bearings to each wheel. Placed in opposition to one another, they compensate for radial and thrust loads.

Complete information about the WRIGHT B-514 Crane and other WRIGHT products is available by writing our York, Pa., office.

WRIGHT CRANES

Wright Hoist Division • American Chain & Cable Company, Inc.

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO

For more facts circle 520 on Reply Card

ROLLING STEEL DOORS

Manually, Mechanically, or Electrically Operated

MAHON CHAIN-GEAR OPERATOR

MAHON STANDARD POWER OPERATOR 920-P

Here is another unusual opening designed for the unusual purpose of permitting a 42-Foot Gantry Crane to move in and out of the plant on tracks. The opening is 44′-0″ x 26′-0″ and, when not in use, is closed by one Mahon Power Operated Rolling Steel Door constructed with 6″ Jumbo Interlocking Slats. No other type of door could meet the requirements of this opening. Mahon Rolling Steel Doors will serve you better in any type of opening . . . the vertical roll-up action requires no usable space either inside or outside—and there are no headroom restrictions. All-metal construction is permanent, maintenance is minimal; and, in steel, you get maximum protection against intrusion and fire. No other type of door provides all of these important features which are so essential for functional efficiency today. When you are ready to buy a rolling steel door, check specifications carefully . . . you'll find, through comparison, that Mahon Rolling Steel Doors are built better to give you better service over a longer period of time. See Sweet's Files for complete information, including Specifications, or write for Mahon Catalogue G-59.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales Offices in Detroit, New York, Chicago and Los Angeles • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Underwriters' Labeled Rolling Steel Fire Doors and Fire Shutters; Underwriters' Rated Metaiclad Fire Walls, Insulated Metal Curtain Walls, Electrified M-Floors, Acoustical and Troffer Forms, Acoustical Metal Ceilings, Steel Roof Decks, and Long Span M-Decks.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Mahon Power Operated Rolling Steel Door installed in a Gantry Crane Opening 44′-0″ x 26′-0″, in the South Bend Plant of the Curtiss-Wright Corp. The Rolling Curtain of this door is constructed with 6″ Jumbo Interlocking Slats.

MAHON

For more facts circle 521 on Reply Card

NEW
GUTH KOLORKODED* industrial fixtures with built-in

Designed to direct traffic, protect your workers, identify various plant or storage areas . . . and create new standards of seeing-efficiency for greater productivity.

They "wash away" ceiling shadows, yet assure high footcandles with comfortable shielding for the working level: 10% uplight with 13° cut-off or 25% uplight with 27° cut-off . . . for 430, 800 or 1500 M. A. operation. Easy installation and maintenance. Three reflector finishes—Permalux White, Porcelain or Alzak Aluminum.

WRITE FOR FREE KOLORKODED BULLETIN

TRAFFIC LIGHTS

*Copyright &U.S. & Can. Pats. applied for.

RLM

Standard Porcelain reflector units (without Kolorkode) for general work areas are RLM listed.

at exits, fire protection systems, keep-out areas, etc.

at stairs, curbs, dead ends and other hazard areas.

in aisles, safe storage, first-aid, etc.

Guth LIGHTING

THE EDWIN F. GUTH CO.
2615 Washington Blvd., St. Louis 3, Mo.
TRUSTED NAME IN LIGHTING SINCE 1902

For more facts circle 522 on Reply Card

MOUNTING GLAND
Eliminated
ON
CHEMPRO
"Wedge-Lock"
mechanical seals

The Chempro line of external "wedge-lock" seals does not require a mounting gland, or any modification to the stuffing box, to align and hold the Chempro seal in position. The patented "wedge-lock" design automatically seats the seal stator in the stuffing box in perfect face-to-face alignment with the seal rotor on the shaft. Simple and easy to install—*in only 20-30 minutes.*

OTHER ADVANTAGES

- Completely Interchangeable with Packing
- Simple in Design—Only 8 Parts
- Chempro Teflon* Shaft Packing—Chemically Inert
- External Seals Adjustable After Installation
- Parts Interchangeable Between Seal Styles
- External and Internal Seals Available—From Vacuum to 100 psi

*du Pont trademark

Write for Bulletins CP551 and 575

CHEMICAL & POWER PRODUCTS, Inc.

7 Broadway, New York 4, N. Y.

For more facts circle 523 on Reply Card

BACKTALK AND FORETHOUGHTS

Edited by Marjorie E. Weissman

Something New Under the Sun

PLANT ENGINEERING:

"Please send us two reprints or tear sheets of the article 'Explosive Forming, Slicing and Extruding.' from the May, 1959 issue of PLANT ENGINEERING." *George Reed, Manager, Research Laboratories, American Car and Foundry, Berwick, Pa.*

PLANT ENGINEERING:

"Please send me tear sheets of the article 'Explosive Forming, Slicing and Extruding,' from the May, 1959 issue of PLANT ENGINEERING." *Ralph E. Kreger, Chief Engineer, Detroit Stamping Co., Detroit, Mich.*

► Readers interested in new and unusual methods will be interested not only in the explosive forming article, but also in an article which appeared in our June, 1959 issue—"New Maintenance Tool—Rocket Power for Welding, Lifting, Extinguishing, Demolishing," which tells what's new in in-plant rocketry.—*Editors.*

Tents for "Clean Rooms"

PLANT ENGINEERING:

"Who makes nylon tents, used to cover areas for dust-free manufacture of equipment?" *Alvin V. Gruber, Sales Manager, Condenser Service & Engineering Co., Inc., Hoboken, N. J.*

► There are several manufacturers of nylon tents for purposes such as Mr. Gruber proposes and the names and addresses have been sent to him. Readers interested in the problem of providing dust free areas for manufacturing should find "Clean Room in a Big Tent," published in our April, 1959 issue, helpful.—*Editors.*

Reducing Glare

PLANT ENGINEERING:

"The April, 1959 issue of PLANT ENGINEERING, publishes an article by T. S. De Rosa on methods of glare reduction. In this article he mentions the use of tinted transparent sheet overlay. Could you please advise me where I could get additional information on this particular material." *R. L. DeMunck, Plant Engineer, Pillsbury Mills, Inc., Hamilton, Ohio.*

PLANT ENGINEERING:

"Please tell us where we can procure the tinted transparent sheet overlay for glass windows, mentioned in your April, 1959 issue, page 99, in the article 'Methods of Glare Reduction'." *Fred C. Hoy, Prod. Spec., Long Beach Naval Shipyard, Long Beach, Calif.*

► The material referred to in "Methods of Glare Reduction—Which One Best Fits Your Needs?" is made by Visionade Manufacturing Co., Inc., 200 Kosciusko St., Brooklyn 16, N. Y. It is available in various shades of green and off-white.—*Editors.*

Kudos

PLANT ENGINEERING:

"For about a year, I have been getting PLANT ENGINEERING and it is of unusually stimulating interest.

"The articles cover a nicely balanced range of subjects and are well edited. All are quite concise and to the point." *Urban Beh, Consulting Lighting Engineer, Newport Beach, Calif.*

Ultrasonics and Heat Exchangers

PLANT ENGINEERING:

"In 'Backtalk and Forethoughts' in the May, 1959 issue of your magazine, you offer the list of ultrasonic cleaner manufacturers to others who are interested. I would appreciate your sending me a copy of this list.

"I do not recall the article 'Ultrasonic Cleaning for Heat Exchanger Tubes' and have gone through several back issues without locating it. Accordingly, if you have an additional copy of the article, I would likewise appreciate having it to read." *H. A. Bach, Sales Manager, Elliot Co., Springfield, O.*

PLANT ENGINEERING:

"Would you kindly send me a list of the manufacturers of ultrasonic cleaning equipment as mentioned in your 'Backtalk and Forethoughts' in the May, 1959 edition of PLANT ENGINEERING?

"Would you also kindly advise me what issue of PLANT ENGINEERING carried the article describing ultrasonic cleaning for heat exchanger tubes?" *C. T. Borchelt, Asst. Plant Engineer, Mfg. General Office, Caterpillar Tractor Co., Peoria, Ill.*

► To the numerous readers who sent posthaste for copies of the "article" on ultrasonic cleaning of heat exchanger tubes, we offer an apology and an explanation.

We find we must admit to a bit of

STANDARD HOSES

LOW PRESSURE	H-9 SAE 30R2	H-100 COTTON COVERED
MEDIUM PRESSURE	H-17 SAE 100R3	
HIGH PRESSURE	H-25 SAE 100R2	
MEDIUM HIGH PRESSURE	H-69 SAE 100R5	
MEDIUM HIGH PRESSURE	H-108 SAE 100R1	
HIGH PRESSURE	H-35	H-50

Spiral Wire Reinforced

REUSABLE ENDS

STEEL

STANDARD 2-PC. END

For fast assembly and positive, leakproof connections. Designed for dependable performance under high pressure. Skive and no-skive.

CLAMP-TYPE

For most two-wire braid high-pressure hydraulic hose applications. No skiving of hose or special tools required.

BARB-TITE ENDS

Fast, easy push-on, stay-on hose ends for all types of low pressure applications. Sizes ¼" to ¾" I.D. Rugged and durable.

HOSE ASSEMBLIES

PERMANENTLY ATTACHED HOSE ENDS

Swaged or crimped permanently attached hose ends. Any quantity, any size, any type. ⅛" to 2". For all working pressures.

CRIMPED

SWAGED

TUBE-HOSE ASSEMBLIES

THE WEATHERHEAD COMPANY

FORT WAYNE DIVISION • Dept. PL-7, 128 West Washington Blvd.

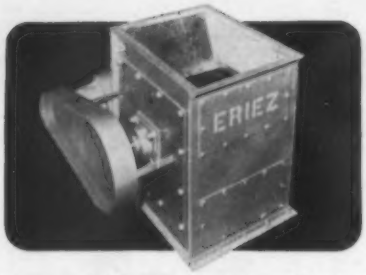
Fort Wayne, Indiana

For more facts circle 524 on Reply Card

UP TO 50% STRONGER than old-style drums!

ERIEZ

non-electric MAGNETIC DRUMS



New, expanded line provides more magnetic power, increased protection! For automatic continuous removal of medium fine iron and tramp iron from foods, grains, plastics, rubber, ceramics, etc. Protects machinery, prevents fires and explosions, eliminates product contamination. Quickly, easily installed at discharge end of chutes, spouts, screw conveyors, etc. *Now with replaceable shell and bearings to eliminate costly maintenance problems!*

MAGNETIC POWER GUARANTEED INDEFINITELY — NO LOSS OF MAGNETIC STRENGTH WHEN OPERATED IN HIGH OR LOW TEMPERATURE INSTALLATIONS — Non-electric; no wires, attachments or fuses — No operating or maintenance costs — For wet or dry materials — Self-cleaning — With or without housings — Adjustable magnetic element; easy drum removal — Wide range of models and sizes.

WRITE TODAY FOR DESCRIPTIVE LITERATURE INCLUDING INSTALLATION AND APPLICATION INFORMATION

Eriez Mfg. Co., 71-U Magnet Dr., Erie, Pa.

ERIEZ

For more facts circle 525 on Reply Card

BACKTALK— FORETHOUGHTS

careless editing in allowing the word "article" to stand in the Backtalk letter referred to above. Our correspondent's letter was quoted correctly, but for the sake of clarity, the word "article" should have been changed. He was, actually, referring to another letter, published in our December, 1958 issue, page 32, inquiring about the practicality of using ultrasonics for cleaning heat exchanger tubes.

A member of the ultrasonics industry has stated that ultrasonic cleaning would not remove scale from a tube, but might hasten cleaning by chemical means. In addition, equipment of suitable size might be prohibitively expensive.—*Editors.*

Portable Cable Cutter

PLANT ENGINEERING:

"On page 58 of the May, 1959 issue of PLANT ENGINEERING is described a machine for cutting wire cable. Would it be possible to obtain more information, specifications and details on this item?" *T. S. Caldwell, Storeroom Supervisor, Longview Fibre Co., Longview, Wash.*

▶ This request has been passed along to Allis-Chalmers Manufacturing Co., Box 512, Milwaukee, Wis., where the cable cutter was devised.—*Editors.*

Plant Engineering Indexes

PLANT ENGINEERING:

"I believe that somewhere in one of the back issues of PLANT ENGINEERING some mention has been made of the availability of an index for the past issues of your magazine. My files are complete from 1954 to present and if this index is available, I would appreciate very much receiving a copy." *Ken Holtz, Plant Engineer, Struthers Wells Corp., Struthers Wells Div., Warren, Pa.*

▶ Copies of the PLANT ENGINEERING indexes are available for the years 1955, 1956, 1957 and 1958.—*Editors.*

Half-Pint Transformers

PLANT ENGINEERING:

"We would appreciate it very much if you would send information on General Electric 'QHT Transformers.'" *W. F. Heath, Plant Engineer, Moretrench Corp., Rockaway, N.J.*

▶ This new transformer which is up to 50 per cent smaller and 35 per cent lighter than previous models, was described on pages 124 and 125 of our March, 1959 issue. The many requests we have received for additional information have been forwarded to the Publications and Film Div., General Electric Co., One River Rd., Schenectady 5, N.Y.—*Editors.*

Protecting Ductwork Against Corrosion

PLANT ENGINEERING:

"I have noted a very interesting article in the December 1958 issue of PLANT ENGINEERING concerning urethane paint.

"I was particularly interested in the experience the author has had in coating a steel bladed fan, exhausting corrosive fumes, which is mentioned in the article. Also any other application which he may have had in mild steel ductwork.

"We have quite a problem in our mill with galvanized ductwork used for heating and ventilation because of the amount of moisture and chemical fumes in the air. We now need to replace a considerable amount of this and have been casting about for some longer-lasting product.

"It would appear that reinforced polyester would be excessive in cost. We have thought of aluminum, but if we could find an adequate coating for steel at a reasonable price, this might solve our problem.

"I should appreciate any information the author might care to give me regarding the result of his experience along these lines." *D. G. Felthous, Plant Engineer, Weyerhaeuser Timber Co., Longview, Wash.*

▶ We have forwarded Mr. Felthous' letter to Edward J. Aquadro, author of the article on uses of urethane paint, who will be glad to send further information—*Editors.*

Fluid Power Maintenance

PLANT ENGINEERING:

"The Products department of Socony Mobil has forwarded to us a copy of the publication 'Fluid Power Maintenance' reprinted from PLANT ENGINEERING.

"We have reviewed the item and find it so worthwhile that we would like to obtain 10 additional copies. Please send them to the Gasoline, Fuels and Lubricants department, attention of M. M. Wilcox. Our Corporation check will be forwarded immediately upon receipt of your invoice.

"Thank you for your assistance." *C. H. Wartman, Manager, Gasoline, Fuels and Lubricants, General Petroleum Corporation, Los Angeles, Calif.*

▶ Single copies of this 48-page reprint cost $1.00.—*Editors.*

For more facts circle 526 on Reply Card ▶

another G-E 8000 development

GENERAL ELECTRIC ANNOUNCES . . .

New Custom '8000'* Motors

PROJECT '8000' . . . a major General Electric program of research, redesign, advanced manufacturing and improved customer service on A-c motors 150 to 6000-hp.

*Trademark of General Electric Co.

CUSTOM DESIGNED . . . New General Electric Custom '8000' motors are built specifically to meet your requirements. Selecting from specially designed enclosures, advanced insulation systems, custom-designed end shield and bearing constructions, and more than 15 custom-designed accessories—plus a countless number of electrical designs—General Electric engineers will create a motor to meet exacting needs, provide initial and continuing economy, and give long, reliable service. Turn page for features of new Custom '8000' motors.

NEW CUSTOM '8000' MOTORS GIVE TOP PERFORMANCE WITH LESS MAINTENANCE . . . HERE'S WHY

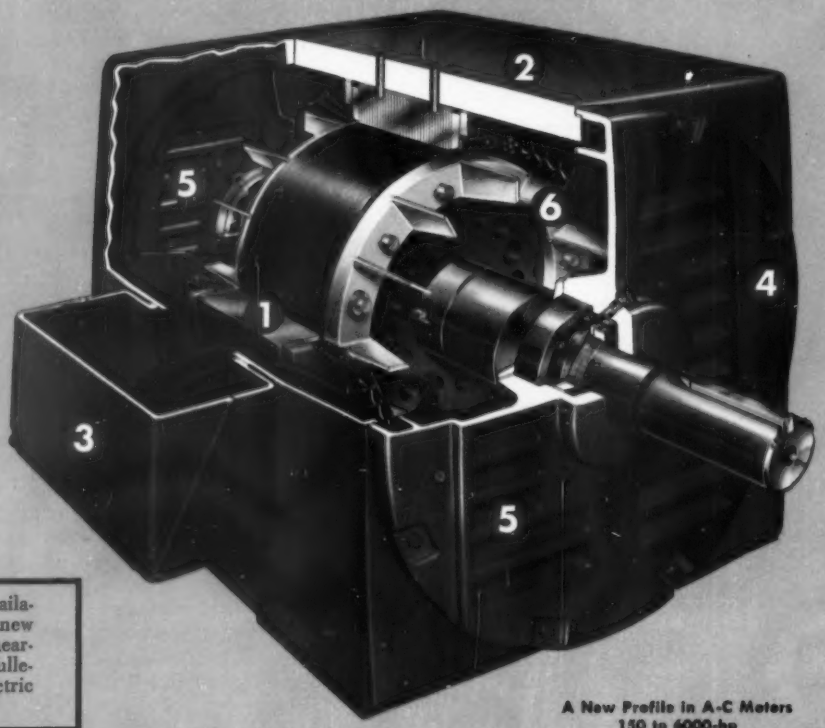
GENERAL ELECTRIC

FROM GENERAL ELECTRIC . . .

another G-E PROJECT '8000' development

NEW Custom '8000'* Motors Give Greater Reliability Require Less Maintenance

1. **LONGER INSULATION LIFE**—Pre-wound core allows closer quality control and gives longer insulation life through improved varnish impregnation or silicone rubber encapsulation.
2. **BETTER CONSTRUCTION**—Cast iron frame withstands 20G simulated transportation shock tests; resists corrosion.
3. **FASTER INSTALLATION**—Conduit box has up to 3 times volume of ordinary boxes; lifting lugs, cast to frame, hold up to 12 times motor weight.
4. **EASIER MAINTENANCE**—Flat end shields are more adaptable to addition of accessories or modifications; are lighter—easily handled by one or two men.
5. **BETTER COOLING**—Double-end ventilation, new duct design and louvred air openings provide more efficient air distribution through motor, reduce hot spots.
6. **LOWER NOISE LEVEL**—Sound power has been cut up to 50% by redesigning frame sections, rotor fans, air deflectors and intakes.



A New Profile in A-C Motors
150 to 6000-hp

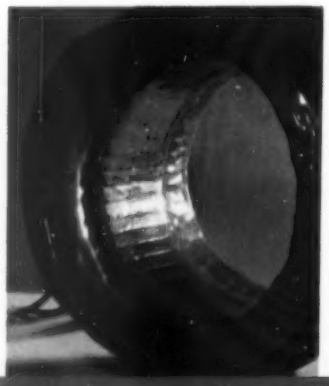
FOR COMPLETE INFORMATION and availability dates about General Electric's new Custom '8000' motor line, contact your nearby Apparatus Sales Office, or write for bulletin GEA-6865, Section 884-2, General Electric Co., Schenectady, N. Y.

NEW *Polyseal* SILICONE RUBBER INSULATION SYSTEM IS AVAILABLE ON CUSTOM '8000' MOTORS

Silicone rubber used in Polyseal insulation systems is a product of General Electric's Silicone Products Dept., Waterford, N. Y. . . . a leader in research, development, and manufacture of silicone materials. Supported silicone tape is a development of General Electric's Insulating Materials Dept., Schenectady, N. Y. Combining silicone rubber with dacron-glass supporting materials is a major engineering advancement, giving this material both the mechanical and dielectric strength required for use as a motor insulation. Polyseal insulation systems are available *only* on General Electric motors. Medium AC Motor & Generator Dept.

FORM-WOUND MOTORS

Polyseal supported silicone rubber insulation system provides greater mechanical, thermal, voltage and environmental endurance than unsupported silicone rubber. Glass fabric materials are imbedded in each layer of silicone tape, which, after coil wrapping is vulcanized under heat and pressure to seal the system against moisture and contaminants. General Electric form-wound open motors with Polyseal insulation system can be used in some severe atmospheres formerly reserved for totally-enclosed motors.



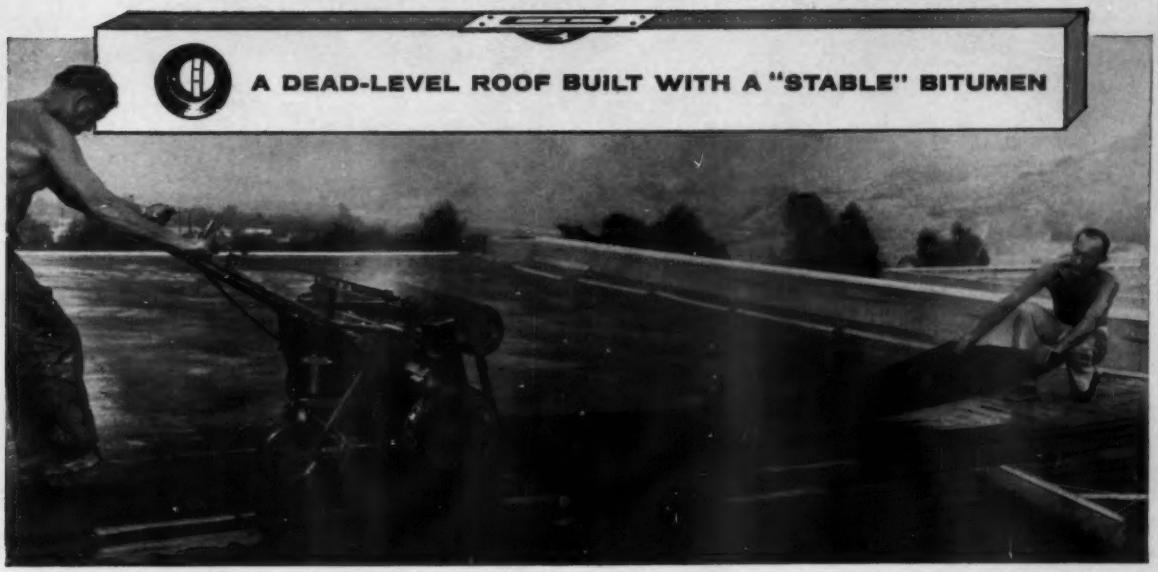
RANDOM-WOUND MOTORS

Polyseal silicone insulation system offers greater flexibility and better heat transfer than existing encapsulations . . . it operates effectively from —90C to 200C and will not crack under excess thermal cycling or severe moisture. After receiving G.E.'s standard random-wound insulation treatments, Polyseal insulation is applied to stator and end turns, completely sealing windings with a thin, waterproof, inert covering which protects against extreme moisture, most chemical fumes, dust and corrosion.

*Trademark of General Electric Co.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Johns-Manville *Aquadam* Built-Up Roofs

Better to begin with—better through years of service

One reason why these dead-level roofs last so long and serve so well is the stability of their unique bitumen, J-M Aquadam. It combines the best features of coal-tar pitch and of asphalt without their weaknesses.

At the beginning of a job, when heated to liquefaction, Aquadam has exceptional kettle stability . . . a prime indication that it will reach the roof with its original characteristics intact. This means better application either by machine or by mop.

Then, through years of service, Aquadam shows superior stability on weathering. It resists oxidation and hardening; will endure continuing exposure to sun, wind and rain.

In addition, Aquadam offers these other advantages: lifelong "self-sealing" properties; high ductility; and dependable protection under wide-range climatic conditions.

For further information on how Aquadam Built-Up Roofs pay off, send for a copy of booklet, "J-M Aquadam Built-Up Roofs." Write to: Johns-Manville, Box 158, New York 16, New York. In Canada, write Port Credit, Ontario.

JOHNS-MANVILLE JM PRODUCTS

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For more facts circle 528 on Reply Card ——→

announcing the most significant hoist development in 25 years!

NEW BALANCED P&H HEVI-LIFT ELECTRIC HOISTS

2,000 to 50,000 pound capacities

a new concept in the application of power and control to hoisting operations

What Is Balanced Design?

Balanced Design means that each part in the new P&H Hevi-Lift hoist has been balanced or matched with every other part for strength, temperature and performance characteristics. *There are no weak parts!* Each part is as strong and dependable as every other part.

As a result, in the new "Balanced Design" P&H Hevi-Lift, no single part is a limiting factor on overall hoist performance. Even under severe duty cycles, motor, gearing and brakes continue to function as designed without excess heating or abnormal wear. It is this unique balance of design and stability of performance that gives the new hoists their name — "Balanced Design P&H Hevi-Lifts."

What will new Balanced Design P&H Hevi-Lifts do for you? For one thing, you'll never again be plagued with petty hoist breakdowns that cost pennies to repair, but mean dollars in lost production. Simply stated, *the new Hevi-Lift will stand up longer under heavier duty cycles with less maintenance than any other hoist made today!*

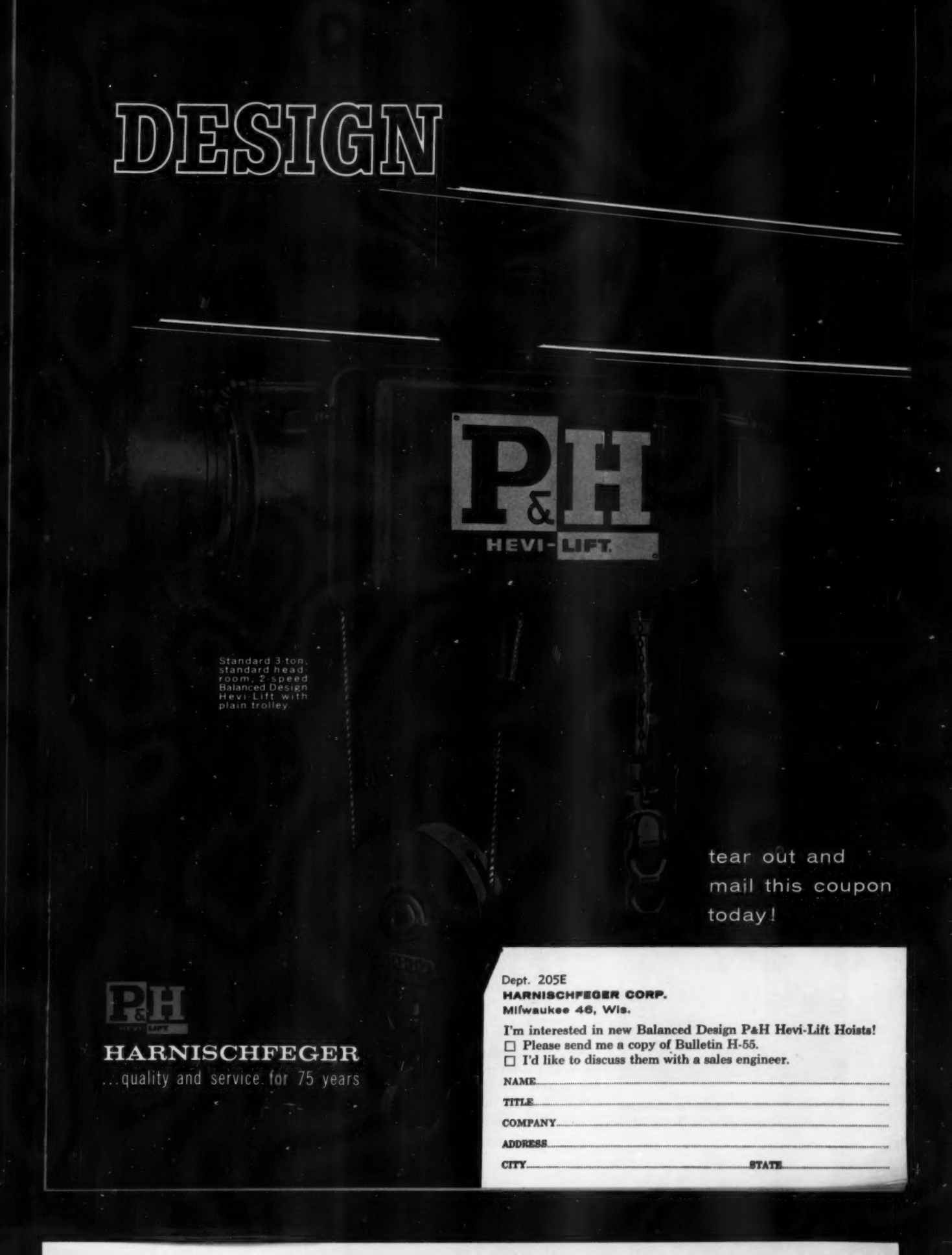
Check These Features

The new Balanced Design P&H Hevi-Lifts are specifically built to provide the solution to every previously existing hoist operating and maintenance problem. For example, they feature: 1) Totally enclosed, weatherproof and dust-proof motor brakes and controls to eliminate maintenance worries, 2) Self-adjusting load brake with extra large linings, oil bath lubricated and cooled, that *never* requires tightening or tinkering, 3) Extra-large, leak-proof design gearcase, with all gears splash lubricated, 4) Lifetime lubrication of all components — there's not a single grease fitting on a Hevi-Lift, and no lubrication headache, 5) Extra-large low-pressure motor brake has only a short 1/32" stroke. There's no punishing hammer action, no pins, linkage or levers—and no need for cooling fans, 6) Alloy steel involute splined shafts and gears of machine tool quality for extra low tooth pressure, long life.

Get the whole story—see the complete line—in Bulletin H-55. Just clip the coupon on the other page and mail it in! Dept. 205, Harnischfeger Corp., Milwaukee 46, Wisconsin.

DESIGN

P&H
HEVI-LIFT



Standard 3-ton, standard head-room, 2-speed Balanced Design Hevi-Lift with plain trolley.

tear out and mail this coupon today!

P&H
HEVI-LIFT

HARNISCHFEGER
...quality and service for 75 years

Dept. 205E
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Milwaukee 46, Wis.

I'm interested in new Balanced Design P&H Hevi-Lift Hoists!

☐ Please send me a copy of Bulletin H-55.
☐ I'd like to discuss them with a sales engineer.

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PLANT ENGINEERS' DIGEST —so those who rush may read and know what's new

Edited by Marjorie E. Weissman

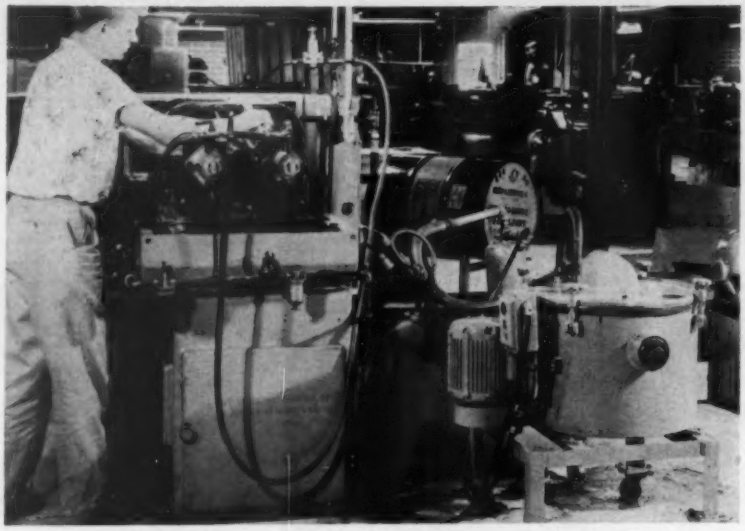
Coolant Cleaned and Reclaimed With Portable Centrifugal Clarifier

BY CLEANING COOLANTS for grinding machines in a portable centrifugal clarifier, Hartford Screw Company's Greenville, S. C., plant saves more than $200 worth of coolant each month. Use of the clarifier also eliminates frequent draining and filling of coolant sumps.

Used with a number of centerless and cylindrical grinding machines that finish aluminum spindles, the 14 gpm clarifier is moved into place on its casters and connected into the coolant return line.

Previously, coolant was drained after it became contaminated and set aside so that abrasive grain and metal particles would settle out. After settling, clear coolant was scooped from the top, but the bottom one-fourth to one-third of the barrel would have to be discarded. To maintain clean coolant it was necessary to change it twice a week.

With clarifier, coolant need not be changed until it breaks down chemically. The amount of coolant saved paid for the unit in its first year of operation. No maintenance was required during the year. The clarifier is cleaned by emptying the 3-gal capacity dirt bowl.



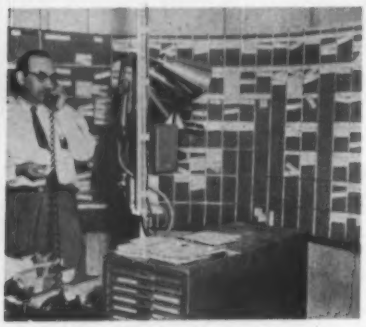
Coolants from grinding machine are cleaned, reclaimed in centrifugal clarifier. The amount of coolant saved paid for the unit during its first year of operation.

The clarifier is used for both sulphurized base and mineral oils and instead of magnetic separators because the products manufactured are made of aluminum.

The clarifier can maintain clean coolant for several machines by shifting it from one to another throughout the day. If they use less than a total of 14 gpm for coolant, several machines may be connected to it at one time. *From a release of De Laval Separator Co., Poughkeepsie, N. Y.*

TV Reports Job Progress as Jobs Move Along Production Line

AS A STEP in our expansion program, closed circuit television is now being employed for production and traffic control of customers' orders. The system includes complete remote control of pan, tilt, focus and lens change.



TV camera relays to main office job progress indicated by tickets on board.

A special room was built in the center of the production area and a TV camera was installed in the center of the room together with associated lighting. A pin-up traffic board built in a circular shape surrounds the camera. This gives a fixed focus length in all directions. Control and monitoring facilities are located in the office area.

Customer calls to the office in reference to job progress may be reported immediately by means of the read-out on the monitor screen. Job tickets indicating job progress are kept up to date in the camera room. As a job moves from one process to another, progress is posted in the camera room. *From a release of Mansol Ceramics Co., Belleville, N. J.*

Welding Powder Reclaimed

A COMBINATION permanent magnetic assembly and vibratory feeder used to reclaim hard-surfacing welding powder in a valve plant has defrayed the cost of installation within the first two weeks of operation.

The installation consists of a vibratory feeder with a fine screen mounted on the tray and a double bank fine iron magnetic grate positioned so that it will receive material as it falls from the tray.

(Continued on page 40)

NEW . . . by CROUSE/HINDS

ARK-trol®

ELECTRICAL CONNECTORS

• Foolproof polarization • Errorless assembly • Maximum interchangeability • Environmental: Exceed rigid military and industrial requirements for resistance to corrosion, chemicals, high and low temperatures, pressure, shock, vibration, dust, humidity, moisture, and leakage of air.

POSITIVE POLARIZATION

Completely foolproof: plug can be mated only with proper receptacle, and in only one way . . . the *right* way. Unsymmetrical contact arrangements preclude improper mating of contacts, or mating of unmatched contact configurations.

FAST, EASY, ERROR-FREE ASSEMBLY

Polarization keyways and unsymmetrical contact arrangement in insert assemblies make improper assembly of parts impossible. One-piece 'snap-in' connectors. Soldering is done outside . . . *before* insertion of contacts.

SEALED AGAINST ENVIRONMENTAL FACTORS

'Stack' assembly includes silicone rubber wafer for impenetrable seal against water, vapors, dust, gas. Basic shells, other metal parts are high-strength extrusions of aluminum alloy, anodized for corrosion, abrasion resistance: 1800 volts are required to penetrate this coating.

MAXIMUM INTERCHANGEABILITY

Components in each diameter are interchangeable and reversible, doubling scope of equipment. Male *and* female shells take either pin or socket inserts: both plug and receptacle may be used 'hot' or 'dead'. Pin and socket configurations available in wide range . . . specials supplied on request.

SHELL SIZES and ELECTRICAL RATINGS

Four shell sizes: from 1-1/16" to 2-9/16" diam. *Voltages:* Military Service Ratings: A, D, E, B, C and Instrument. NEC Rating: 600V. A.C. *Contact sizes:* #16 to #4/0 inclusive. Write for Bulletin 2711 containing complete descriptions, specifications and configuration patterns for both Type RPE and RPC *ARK-trol* Electrical Connectors.

Available in two types:

TYPE RPE ENVIRONMENTAL
- Moisture Proof
- Shock Insulated
- Dust-Tight
- Corrosion Resistant
- Grounded & Non-Grounded

TYPE RPC CIRCUIT BREAKING
- All Features of RPE *Plus* . . .
- Circuit Breaking under full Rated Load

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For more facts circle 529 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

Welding powder is reclaimed by magnetically removing iron contaminants.

Welding powder which, during use, has accumulated fine iron contamination, is poured into the sieve. The vibratory action of the feeder strains the powder through the sieve, which traps non-ferrous contaminants.

The feeder tray passes the powder to the magnetic grate where the iron contaminants are detected and separated, leaving the welding powder clean and ready for use. Fine iron accumulations are periodically removed by wiping the tubes with a cloth. *From a release of Eriez Manufacturing Co., Erie, Pa.*

Unusual Insulation Technique Employs Cement Gun

THE PROBLEM of reducing construction time on a distillation plant on the island of Aruba, in the Caribbean, was solved by starting the production of fresh water before applying the insulation to the 35 evaporators, the deaerators and main steam piping.

Applying block insulation to the cold evaporators before start-up would have taken several months because of the size of the job, the many irregular projections on the equipment, and the shortage of trained labor. Instead, an unusual method of blowing granulated insulation onto hot (215F) surfaces was developed.

Vermiculite insulation slurry is applied to surface with standard cement gun.

The method promised substantial cost savings.

A total of 80,000 lb of lightweight expanded vermiculite insulation was forced through a standard cement gun nozzle by 100 psig compressed air. Water was introduced at the nozzle tip and the resulting mix hit the hot metal surfaces with high velocity.

There was no rebound and no steaming. Adhesion was so good that the vermiculite can now be removed only with chipping hammers.

After placement of the insulation to an average thickness of two inches, workmen troweled the surface smooth and then weathercoated it with a heavy pre-mixed black asphalt.

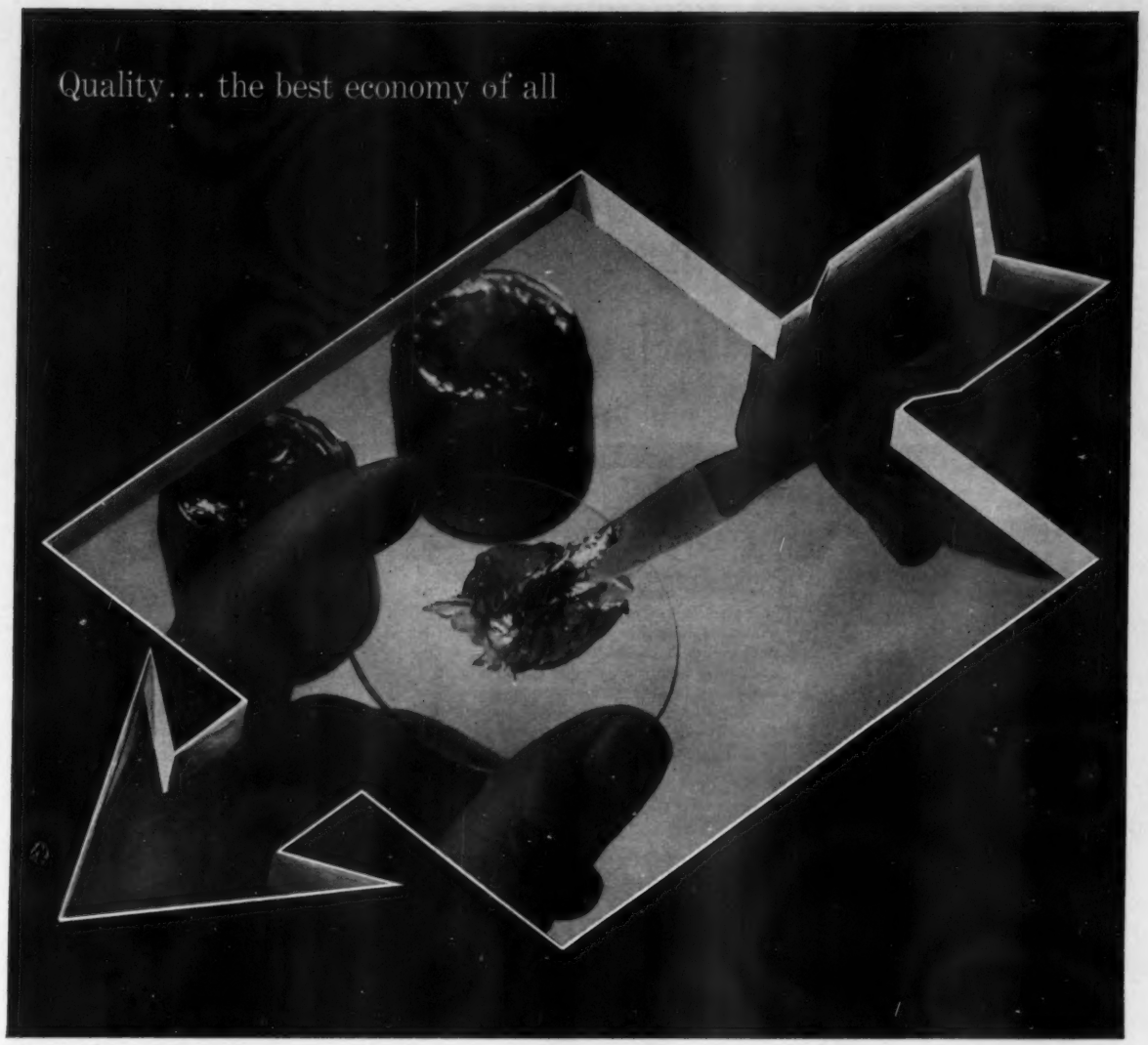
Use of vermiculite and the "spraying" technique in this instance not only solved a pressing time problem, but also effected an estimated saving in costs of 50 per cent compared to the more conventional, low-conductivity block insulation. It is not believed, however, that such a saving could be realized in high labor cost areas. *From a release of Singmaster & Breyer, New York, N. Y.*

Flexible Work Unit for Acid Handling Developed in Shop

Fumes from beaker are pulled into acid handling sink and blown out through tubular ducts below in demonstration of unitized work station built in plant shop. Station has possibilities for electromechanical and chemical operations. (From Hughesnews, published by Hughes Aircraft Co., Culver City, Calif.)

Test for Toxic Gases

FIRST STEP in General Telephone Company's latest method of checking manholes for possible concentrations of explosive and toxic gases is to lower a sampling hose attached to an explosimeter, six



It's a multipurpose grease . . . but *how* multipurpose?

You can't "feel" the answer. Any "multipurpose" grease you buy is a compromise. Lubrication engineers say it *can't possibly be* the best lubricant both for high speeds and low loads . . . and for low speeds and heavy loads. It's *got to be* somewhere in between, so that it can do both jobs fairly well.

What you should do is decide on *which* multipurpose grease is best for you. This is a decision for an expert team—you and your Sun representative—because you have to consider many variables.

We feel, justifiably, that one of Sun's Prestige Multipurpose Greases is designed with that wide range of applications you're looking for. They last longer under pressure, water, heat, and other abuses. They bear investigation. To start enjoying the real economy of quality, call that Sun man today—or write

SUN OIL COMPANY
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MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

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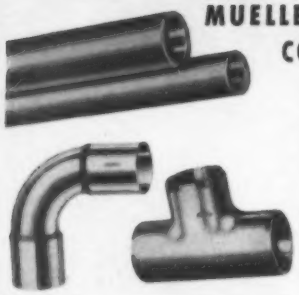
You Can Get Everything
for every kind and type of
INDUSTRIAL PIPING SYSTEM
From *ONE* Dependable Source



MUELLER BRASS CO. Streamline COPPER TUBE AND FITTINGS

Streamline Copper Tube and Solder-Type Fittings make a tight, sanitary system with clean, unobstructed joints that withstand jars and vibrations. Streamline tube and fittings are lightweight, (longer lengths can be conveniently handled, eliminating many fittings); resist corrosive acids, clogging, will not rust. Products available include K, L, M and DWV copper tube as well as both cast and wrought solder-type fittings in a complete range of sizes.

MUELLER BRASS CO. PVC RIGID PIPE AND FITTINGS

PVC for industrial piping withstands shock, impact, vibration and twisting; can be used at higher pressures than other similar materials. PVC resists corrosive action of water, oil, alkaline or salt solutions, gases and a wide variety of acids. Economical, lightweight, PVC is fabricated in 20' lengths; ½" through 3" sizes.

MUELLER BRASS CO.
VALVES OF ALL TYPES

Streamline valves are ruggedly designed and built to give years of trouble-free service. They are made of non-porous, cast red brass and all working parts are precision machined for perfect alignment of seating surfaces. Positive seating is further assured by tough composition discs. Complete range of sizes and styles includes compression stops, gate, globe and swing check valves, boiler drains and sill cocks.

Write today for complete information on Mueller Brass Co. products for any industrial piping system.

282

MUELLER BRASS CO.
PORT HURON 52, MICHIGAN

For more facts circle 531 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

Simple check is made for toxic or explosive gas before entering a manhole.

inches through a small aperture in the manhole cover.

The sample drawn is passed through the instrument. If a high explosive concentration is indicated, the cover is not removed. If lesser concentrations are shown, or no explosive gas is indicated, a second test is made with the manhole partially open.

The gas testing kit used contains equipment which detects the presence of carbon monoxide and hydrogen sulfide. Former testing methods required separate procedures and more time. *From a release of Mine Safety Appliances Co., Pittsburgh, Pa.*

Automating Building Surveillance

A REMOTE CONTROL system for monitoring a distant warehouse for fire and unauthorized intrusion, has been extended to permit access to the facility during non-working hours.

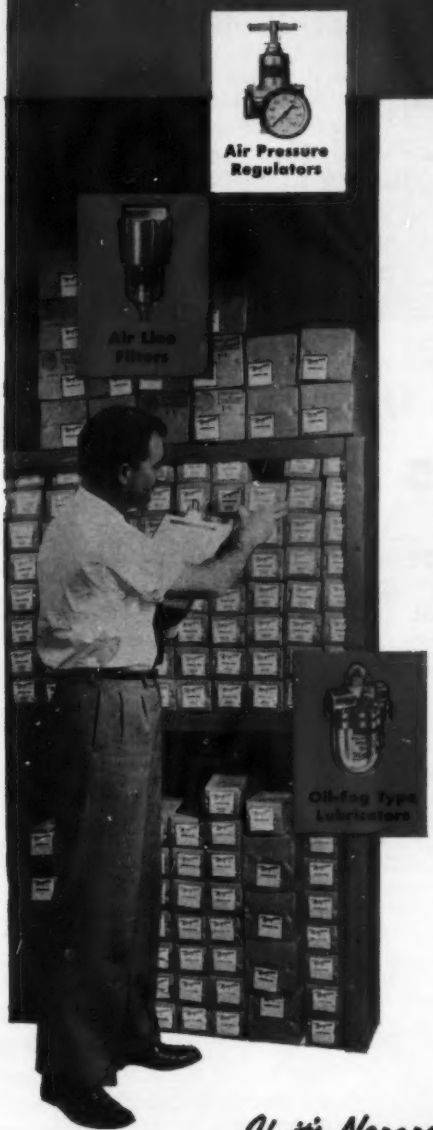
The result is after-hours automation of the watchmen's service, although a uniformed security guard "calls the shots" by code word from the main plant eight miles away.

The arrangement, which makes use of telephone company lines between the warehouse and plant, is part of the plant security system of Standard Pressed Steel Co., Jenkintown, Pa.

A voice connection between ware-

Only Norgren offers such extensive local stocks

Norgren PNEUMATIC PRODUCTS



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A telephone call to your nearby Norgren representative will bring quick, expert engineering service.

C. A. NORGREN CO.

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For more facts circle 532 on Reply Card

NEW dry acid compounds are measured, mixed with water for use. These cleaners are non-fuming, produce no corrosive gases... dry or in solution.

OLD-type liquid cleaners require special handling precautions. Fumes are a nuisance to personnel, can cause damage to electrical and other equipment.

✓No Hazardous Fumes

Just one of the reasons why **Dry Acid Cleaners** based on **Du Pont Sulfamic Acid** are gaining wide favor for industrial equipment cleaning: ✓ Safer to handle ✓ Easy to use ✓ No hazardous fumes ✓ Powerful descaling action ✓ Less corrosive ✓ Lower handling and shipping costs.

CLEANERS BASED ON SULFAMIC ACID REMOVE SCALE AND DEPOSITS FROM:
Steam Boilers, Condensers, Heat Exchangers, Piping.

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BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

Please send me:

☐ Free booklet about dry-acid cleaners based on Du Pont Sulfamic Acid

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PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

house and plant gives authorized personnel from the main plant access to the warehouse without need of a key. The individual needing access to the warehouse notifies the guard at the main plant gate which warehouse he wishes to visit. The guard gives him a code word. When the employee reaches the warehouse he talks into a speaker, which is connected with the main plant, identifying himself by name and the given code word. The guard then presses a button which permits entrance to the building.

Monitors for fire and forced entry

Security officer at console monitors warehouses for fire and forced entry.

are wired into a console control panel at the desk of the main guard post, which is manned around the clock. A buzzer and light indicate either fire or illegal entry, while a meter needle indicates in which building the action occurred. *From a release of Pinkerton's National Detective Agency, Incorporated, New York, N. Y.*

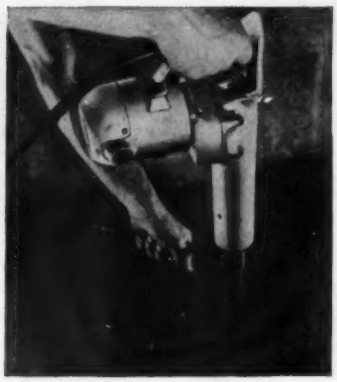
Lubrication for Crane Wheels

THE CRANE WHEELS on a crane in the electric weld pipe section of a Pittsburgh mill used to have a life expectancy of four months. Since using a dry, graphite-carbon type lubricant on wheels which had already been in service for two months, no further signs of wear are visible after 12 months' use.

The dry lubricant is applied to

Look what Black & Decker's 1⅛" Hammer can do for you!

BREAKING holes through concrete or brick; demolition work goes easier with bull point tool.



INSTALLING electric outlets in concrete is a cinch with a B&D Hammer.

TRIMMING excess metal or scaling after the job's done goes fast and easy with cold chisel.

MOUNTING electric signs, switchgear, etc. is fast work with powerful Hammer and star drill.

2,200 cutting blows a minute speed up electrical jobs

Here's the tool that helps you slash preparation time laying conduit in concrete floors and in scores of other jobs! Rugged Black & Decker Electric Hammers are *power*-packed to deliver thousands of hard, rapid, cutting blows to send your man-hours tumbling; output per worker climbing.

See for yourself what the B&D 1⅛" Hammer can do for you in drilling, digging, piercing, breaking, chiselling and dozens of other operations. Mail coupon for free demonstration or additional information. THE BLACK & DECKER MFG. Co., Dept. 0807, Towson 4, Md. (In Canada: Brockville, Ontario.)

Look Under "TOOLS-ELECTRIC" in Yellow Pages

Leading Distributors Everywhere Sell

B&D Black & Decker®

Quality Electric Tools . . . Power-built for top performance

MAIL TODAY FOR FREE DEMONSTRATION

THE BLACK & DECKER MFG. CO., Dept. 0807, Towson 4, Md.

☐ Please arrange a free demonstration of your 1⅛" Hammer
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Name_____ Title_____

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For more facts circle 534 on Reply Card

You can see how Nuclear Metals, Inc. put an end to drainline troubles

No more undetected clog-ups. No more corrosion. No more patchwork maintenance. No more *leaks.*

That's the story at Nuclear Metals, Inc., Concord, Mass., since they installed an extensive drainline system of PYREX® pipe.

This is the pipe you can *see into;* so, you can spot clog-ups before they cause trouble. But that's just the beginning—there's *no leakage* at the joint because of the positive compression seal—no pocket for corrosive wastes to sit in—both pipe and gasket are corrosion resistant. And because glass is *smooth* you seldom have to worry about buildup inside the pipe.

You can forget about *corrosion* because this pipe is made from PYREX brand glass No. 7740. This is the glass developed originally for lab use. It stands up to most acids and alkalies; it's unaffected by live steam. It's seldom affected by jolting temperature differentials.

Result? Very easy to clean. Very little need for replacement. No more patchwork maintenance. No more drainline troubles at all!

Get all the facts today. Send for PE-30, "PYREX® Pipe for drainlines." Write to Corning Glass Works, 10 Crystal Street, Corning, N. Y.

CORNING GLASS WORKS

CORNING MEANS RESEARCH IN GLASS

For more facts circle 535 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

the wheels and rails in the form of a rectangular rod which fits in a specially designed holder. It is necessary to equip only one wheel on each side of the center crane in use, since the lubricant is transferred from flange to rail to flange, etc.

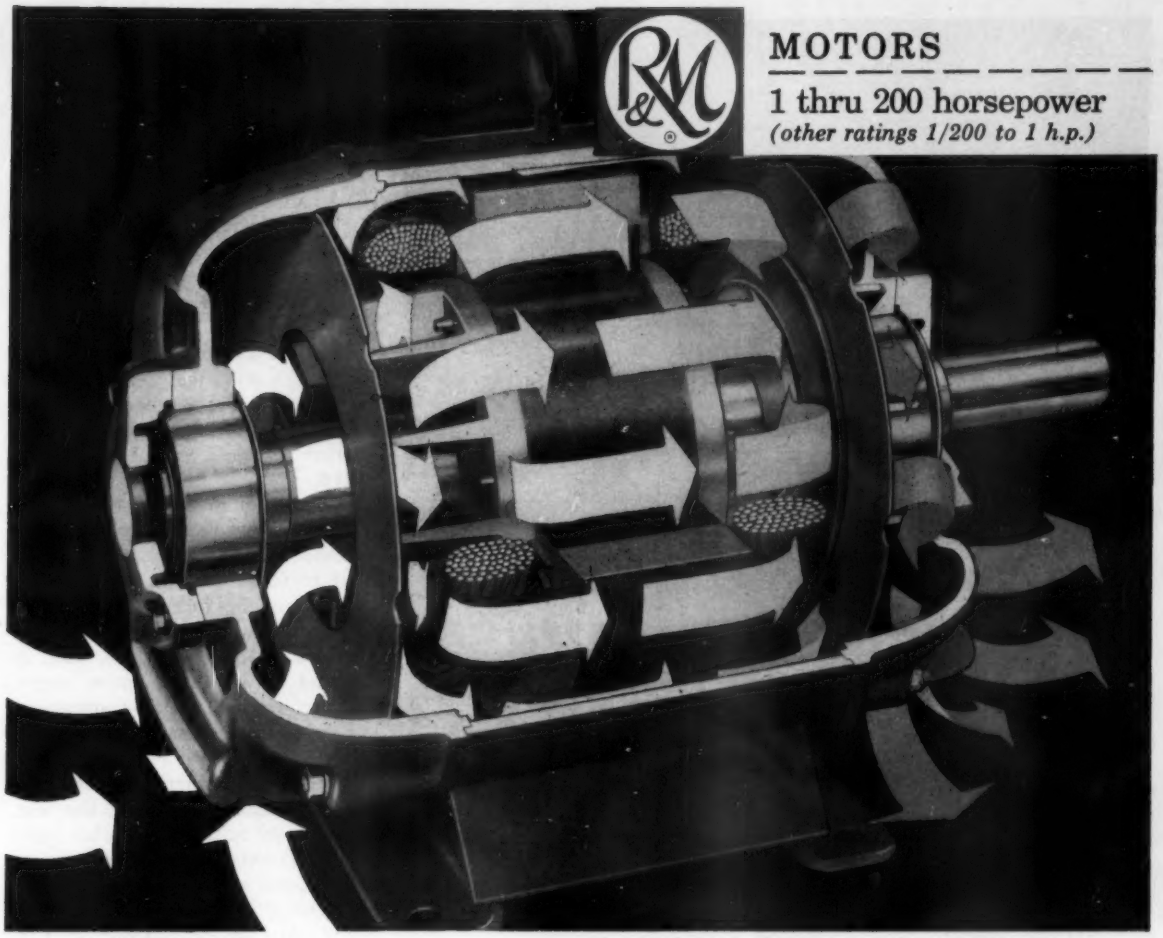
The film is resistant to pressure and will not collect dust and dirt; nor will it spread over the contact surface of the wheel, causing loss of friction. *From a release of Ringsdorff Carbon Corp., East McKeesport, Pa.*

Ceramic Magnets

Ceramic magnets which have twice strength of iron magnets, are made by mixing two metallic oxides under heat and pressure. Strength is retained at high temperatures. (From a release of Boeing Airplane Co., Seattle, Wash.)

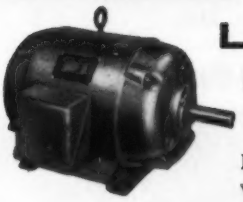
Technique for Cleaning and Painting Metal Parts

SAVINGS as high as 50 per cent over conventional systems in initial investment and operating cost are possible by use of a trichlorethylene-based system of integrated vapor degreasing and application of paint by flow coating. Principal savings result from the recovery of oversprayed paint and volatile thinner and economies in labor and utilities costs are effected by combining cleaning, painting, and drying steps in a single machine. All operations are carried out beneath a protective "blanket" of trichlorethylene vapor. Work en-



MOTORS

1 thru 200 horsepower
(other ratings 1/200 to 1 h.p.)

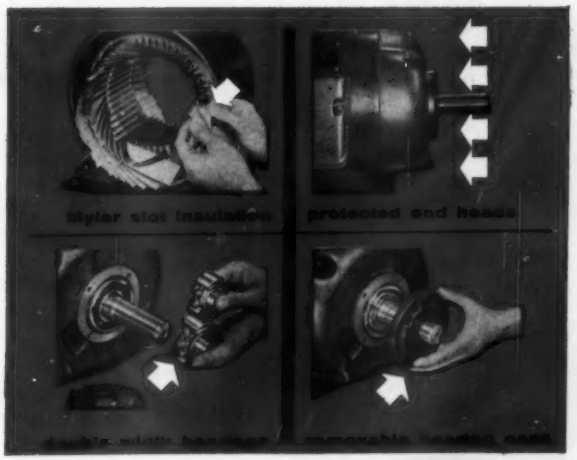


Longer Life because High Velocity *"Dual-Sweep"* ventilation *Cools and Cleans!*

ROBBINS & MYERS "Dual-Sweep" ventilation is a new concept in high velocity internal cooling and cleaning, designed to greatly prolong motor life. Tandem fans—one pushing, one pulling—create end-to-end ventilation that eliminates "dead" areas and converging air currents which deposit dirt. Venturi baffles at each end of the motor direct air in a washing action over and around end coils where it's most needed. Passages between field and outer shell form a "cylinder of air" which carries off motor heat.

R&M motors' long-life insurance also includes these features: Mylar* insulation that has 8 times the dielectric strength and 35 times more moisture resistance than ordinary paper insulation . . . double width bearings with extra-large grease capacity . . . end heads that offer full height protection . . . removable caps for quick bearing inspection and re-lubrication. For details, write today for Bulletin 520-PE

**DuPont registered trademark*

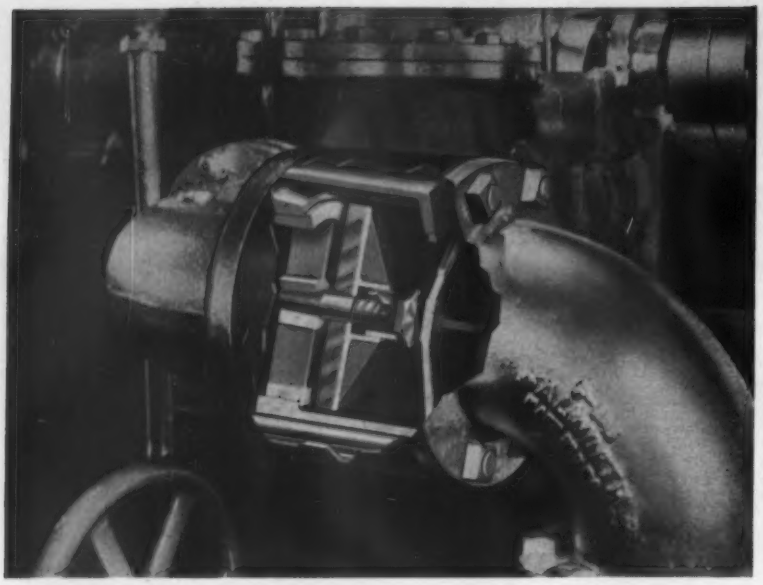


ROBBINS & MYERS, INC.

motors, household fans, Propellair industrial fans, hoists, Moyno industrial pumps

SPRINGFIELD, OHIO • BRANTFORD, ONTARIO

For more facts circle 536 on Reply Card



CPV CHECK VALVES ARE SILENT

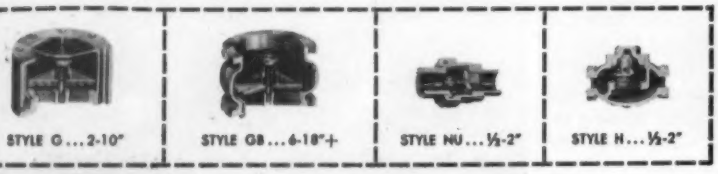
. . . and this non-slam feature is your *positive* assurance of a silent, safer piping system, with protection to the pump, and other equipment.

Easily installed wherever liquid flows, a CPV Check Valve closes automatically as soon as forward flow stops. The valve is closed before any reverse flow occurs. Dangerous line surges and hammer are eliminated without expensive air cushions, shock absorbers and other devices.

Only CPV CHECK VALVES Give You All These Features

- Straight guided disc with two point bearing assures positive valve seating.
- Helical spring is engineered to close automatically as soon as forward flow stops.
- Ideal for all pressures and temperatures—including high temperature water.
- Available in a wide variety of materials, including Alconite, bronze, steel, stainless steel and monel.
- Easily installed in any position.
- Full radial flow with minimum head loss.
- Approved by Factory Mutual Laboratories for fire lines.
- Choice of four basic types in sizes from ½-in. to 18-in. or more.

Get the full story about CPV Silent, Non-Slam CHECK VALVES. Write today for Catalog C.



COMBINATION PUMP VALVE CO.
851 PRESTON STREET • PHILADELPHIA 4, PA.
SOLD BY RELIABLE AGENTS IN PRINCIPAL CITIES

For more facts circle 537 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

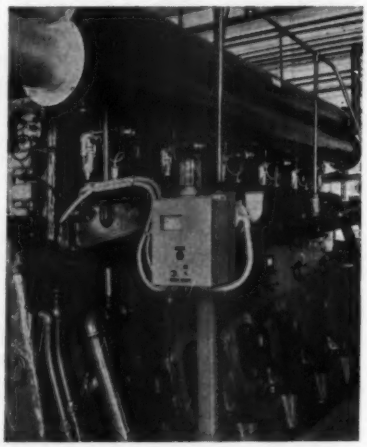
ters at one end, is cleaned, painted, and removed from the machine free of trichlorethylene thinner.

When an air drying paint is used, the parts are dry and ready for shipment when removed, since evaporation of the thinner occurs instantly as the part leaves the machine throat. When a baking paint is used, the parts proceed immediately to the baking operation. Where a second coat of paint is desired, in some instances it can be applied prior to baking the primer.

Tests show that trichlorethylene-thinned paints with properties similar to those of most conventional paints can be formulated. In general, any paint ingredient which is soluble in trichlorethylene, such as certain alkyd resins, epoxy esters, acrylic resins, asphaltic materials, chlorinated rubbers, etc., can be used.

Present machinery was designed for automated production line use, but can be adapted for other types of operations, including dip painting instead of flow coating. *From a release of Electrochemicals Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.*

Guardian of Diesels



At Mantua, Ohio, pumping station each of four diesels is protected by scanner, with red alarm lights and rear-mounted klaxons which operate when cylinder exhaust gas temperatures become excessive. (From a release of Assembly Products, Inc., Chesterland, O.)

LOOK *at the hazards in floor maintenance*

SLIPPERINESS

Taking slipperiness out of your floors is worthwhile insurance against slips and falls.

It's easily done with a specially blended West resin emulsion. This safe, high-traction finish contains no wax — yet produces a glossy, hard, durable film on all types of floors.

Slipperiness is only one of many floor problems. Others are just as common. Staining. Dirt retention. Excessive dust. High labor costs. To name a few. All can be prevented — often at reduced cost — with a complete WEST FLOOR CARE PROGRAM.

The WEST FLOOR CARE PROGRAM consists of three basic steps. Cleaning. Sealing. Maintaining. Each adapted to the individual needs of floors by West Representatives who specialize in methods as well as materials.

We'd be glad to show you how a WEST FLOOR CARE PROGRAM protects floors, modernizes methods, eliminates hazards. Write, or telephone your local West office.

Programs and Specialties for
Protective Sanitation and Preventive Maintenance

WEST CHEMICAL PRODUCTS INC.

WEST DISINFECTING DIVISION

WEST CHEMICAL PRODUCTS INC., 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Ave., Montreal

☐ Please send your 32-page booklet, "The Proper Care of Floors."

☐ Please have a West Representative telephone for an appointment.

Name_____

Position_____

Mail this coupon with your letterhead to Dept. 13

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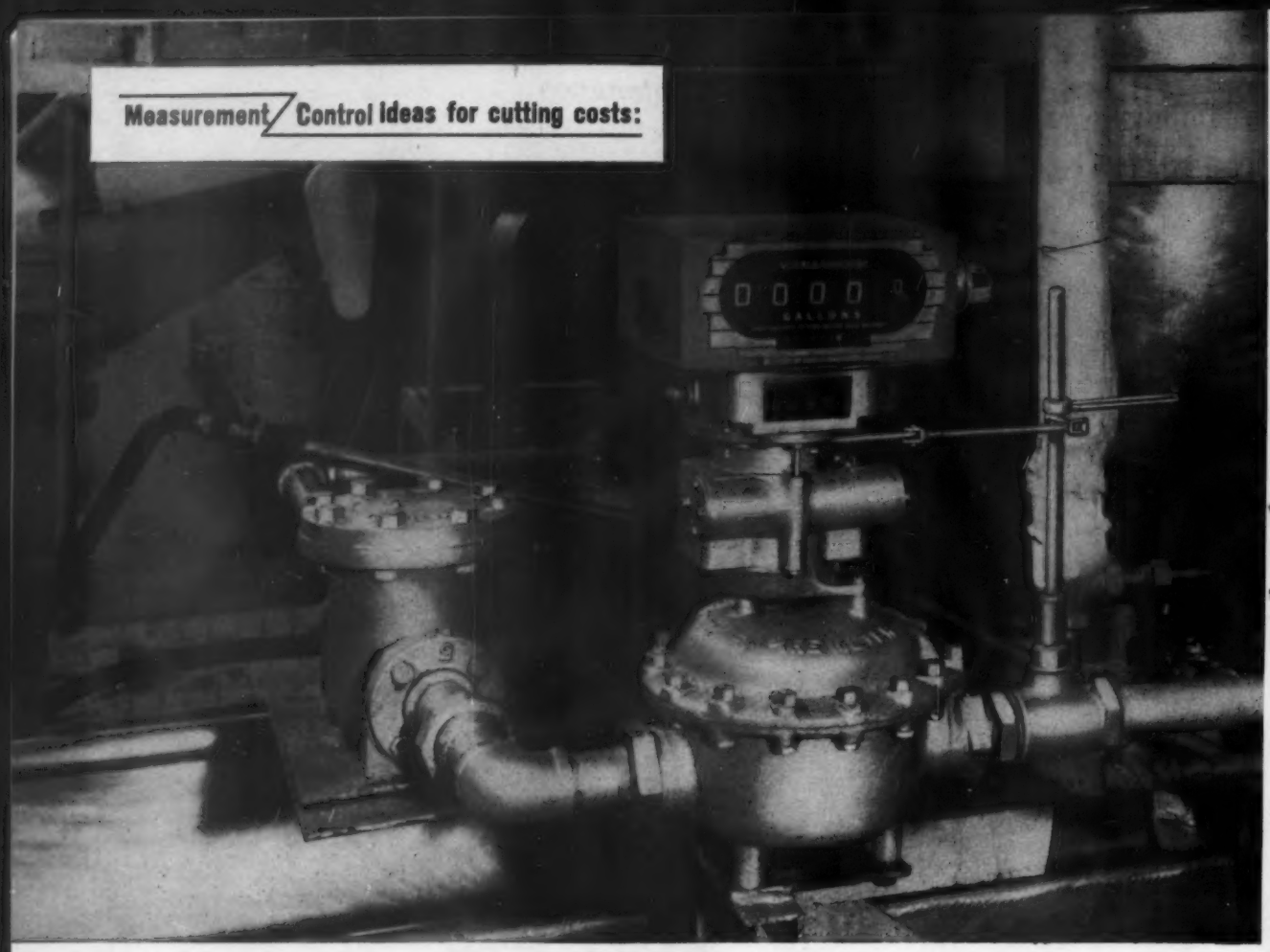

How a liquid meter SAVED A "BATCH" OF MONEY

Above is shown Rockwell liquid meter with an automatic pre-determining shut-off valve. A Rockwell Field Engineer recommended the meter to replace manual batching of lard at a large midwest packing plant. Previously, the lard was carted to scales, weighed, and dumped into process vats. Now batching is *automatically* controlled and measured at considerable saving of time and money.

This is just one example of the many ways Rockwell Field Engineers are helping save time, money, and material in a wide variety of manufacturing and process plants by suggesting new and better methods of measurement and control. These field men represent Rockwell's experience as the world's largest manufacturer of measurement and control products. Wherever liquids or gases flow through pipe in your plant, this experience can help you cut costs and improve quality. Why not have a Rockwell Field Engineer visit your plant to explore new approaches to cost cutting through improved measurement and control. Send the coupon today—there is absolutely no obligation.

ROCKWELL

The leading single source for Measurement/Control products and ideas

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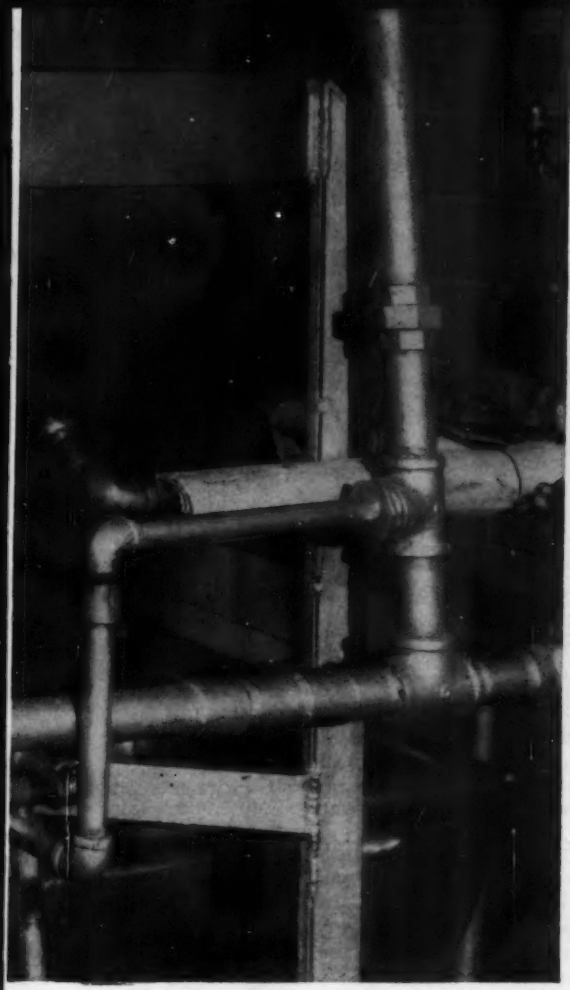


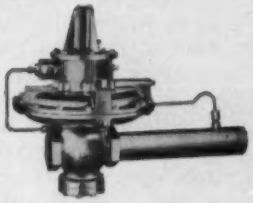
"IN-PLANT" METERING:

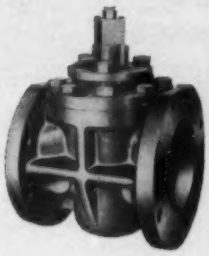
LIQUIDS AND GASES

Rockwell gas and liquid meters, properly applied, can improve quality control, sharpen cost control, and prevent waste in almost every plant department. A Rockwell Field Engineer can help you find *where* meters will cut costs . . . and Rockwell has a complete line of meters to measure practically anything that will flow through pipe.

CONTROLLING PIPED MATERIAL:

LIQUIDS AND GASES





More efficient control of all the material flowing through pipes in your plant is a positive step in cutting costs. There are new applications and new ideas for using gas pressure regulators and valves that will stop wasteful, inefficient, and dangerous handling of fuels, production fluids, and products. A Rockwell Field Engineer can show you *where* and *how*.

HOW MUCH COULD YOU SAVE?

There is hardly a plant of any kind—including yours—where the right application of the right measurement and control methods and equipment won't produce savings many times the modest cost involved. It will cost you nothing to have a Rockwell Field Engineer *show* you. Simply send the coupon below, now.

SEND COUPON NOW!

MEASUREMENT & CONTROL DEVICES

another fine product by

ROCKWELL

Rockwell Manufacturing Company, Pittsburgh 8, Pa. Dept. MC 2-G

☐ Please have a Rockwell Field Engineer call me for an appointment.

Please send literature on ☐ Controlling gas pressures; ☐ Valving gases, liquids and slurries; ☐ Measuring liquids; ☐ Measuring gases.

I am concerned primarily with ☐ Light & Heavy Metal Fabricating ☐ Basic Chemical Production ☐ Chemical Processing ☐ Food, Drugs & Tobacco ☐ General Manufacturing Operations ☐ Petroleum Processing

☐ Others: _____

Name: _____ Title: _____

Company: _____

Address: _____

City: _____ Zone: _____ State: _____

OPERATION AND PRODUCTION —pointers for the industrial plant engineer

Edited by Vern Kempf

Shielded Arc Button Welding Technique Joins Metals Through Oil and Grease

EXPECTED to find wide application in the welding of metals from 0.035 to 0.187 in. thick, a new low cost method of joining steel has been introduced by the Welding Products Division of the A. O. Smith Corporation, Milwaukee, Wisconsin. The finished weld resembles a rivet or button head and is made possible through a new attachment designed to work with the company's constant potential welding machine.

A consumable electrode adds filler metal to the weld and carbon dioxide gas is used as a shielding agent. The size of the button can be changed to suit the application by varying voltage, wire-feed speed, weld current and the number of time cycles. Once set, the system reduces operator error and produces identical welds consistently.

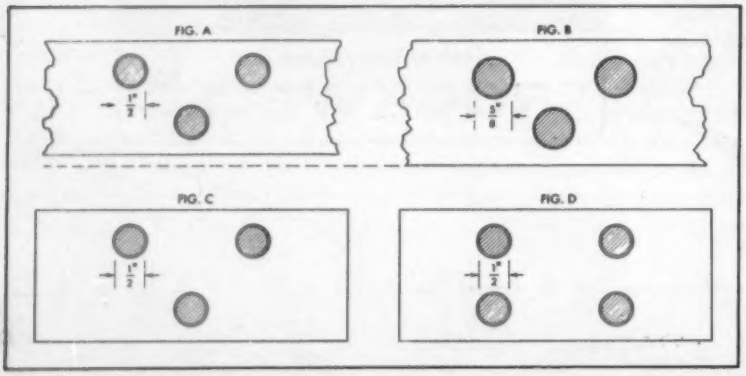
Comparing favorably with resistance spot welding or riveting, the system is particularly adapted for an accurately timed burn-through method of joining lighter gages of mild steel. Heavier sheet metal is joined by plug welding, a system where a hole is punched into the top sheet. This method is generally used on stock over 3/16 in.

Welding can be performed through oil and grease since the button weld method does not depend upon surface electrical resistance. The arc shield completely covers the area to be welded and tinted safety glasses protect the operator against the reflection flash seen through four small gas outlet ports.

Complete setup, shown at left, consists of 400 amp constant potential power source, wire-feed drive unit and semi-automatic hand gun. Cross section of two welds, at right, shows penetration obtained with button welding attachment.

Stronger Bolts Can Cut Material and Assembly Costs In Your Plant

HIGH STRENGTH bolts should be given wider consideration for applications where their superior holding power would not ordinarily be called for, according to engineers at Russell, Burdsall and Ward Bolt and Nut Company. Wherever high strength bolts allow reduced diameters or fewer fasteners there are good possibilities for lower assembly costs and savings in material to be joined.



Smaller holes with stronger bolts, A, permit smaller joint section and less material than B. Stronger bolts reduce number of holes to be drilled and filled from four, D, to three, C, while maintaining load capacity close to 40,000 lb.

An engineer designing a simple bolted joint usually limits selection to three standard types of fasteners. These are machine bolts, bright cap screws and for critical joints, high strength bolts. High strength bolts cost more per unit than the other two but can reduce the total cost of the joint in many ways.

Frequently the cross section of the joint can be reduced with smaller diameter high strength bolts. They can be placed closer together and closer to the edge of the pieces to be fastened to permit smaller joint sections and consequent savings in materials. These savings can run high when working with costly materials such as copper bus bars.

Reducing the number of fasteners used can often slice assembly costs.

(Continued on page 54)

quickest TO ERECT

quickest TO INSTALL

quickest TO RE-ARRANGE

quickest TO PAY FOR ITSELF

DELUXE

STEEL SHELVING

quickest BECAUSE...

. . . you realized that a shipment of knockdown shelving parts has no useful value. It must first be assembled into shelving racks for storage utility. The faster these racks are erected, the lower your installation cost. So, because Deluxe steel shelving is erected the quickest, your *installed cost* is the lowest.

The film strip shows 6 engineering features of Deluxe steel shelving that promote quickest erection. Take the patented Deluxe boltless shelf bracket . . . it replaces 90% of the time-consuming nuts and bolts and allows not only quickest installation, but easy shelf adjustment.

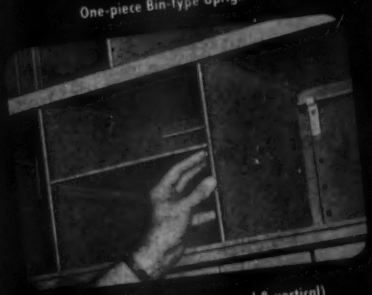
THE PROOF: At 1958 trade shows, two untrained girls erected a complete closed section of Deluxe Boltless Steel Shelving in *less than 5 minutes.*

Call your local Deluxe dealer or write for the new, complete Deluxe Shelving Catalog No. 30.

Patented Boltless Shelf Bracket

Factory Built-in Shelf Reinforcing

One-piece Bin-type Upright



Snap-in Dividers (horizontal & vertical)

Clip-on Bin Fronts

Bottom Shelf Support and Floor Angle

DELUXE

DELUXE METAL FURNITURE COMPANY · Warren 7, Pa.

A Division of the Royal Metal Manufacturing Company

For more facts circle 540 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 52)

For example, three bolts placed 120 degrees apart around a common center provide as stable a joint as one fastened with four bolts 90 degrees apart. According to fastening specialist, the additional work involved in drilling and filling the extra hole is seldom justified.

Four half-inch-diameter high strength bolts cost less than four ⅝-in. cap screws and provide the same holding power. Three high strength bolts cost less than four cap screws with the same holding power. A good rule to follow to get the best fastener value is to buy bolts in terms of holding power. A dollar's worth of holding power in high strength bolts costs $1.50 in cap screws and $1.65 in machine bolts.

Pit Simplifies Scrap Handling

FLOOR PITS in three machining departments at Greenlee Brothers & Company, Rockford, Illinois, help reduce manual handling of metal scrap. Each pit holds four hoppers and a sign above each hopper clearly indicates which type of scrap goes into it.

Scrap is collected from machines and brought to the hoppers in wheelbarrows. Since the tops of the hoppers are at floor level, it is a simple task to tilt the wheelbarrow to dump the load into the hopper. Before the pits were installed, scrap had to be shoveled from the wheelbarrow to the hopper.

Removing hoppers from the pits is accomplished with a shop-built hook placed on the forks of a lift truck. The hook fits into eyes welded to the sides of the hoppers. The hook is used to lift the hopper from the pit and then removed so that the fork truck can carry the hopper in the usual manner to an outside scrap bin.

Scrap collected in wheelbarrows is easily dumped into hoppers in floor pit.

Hoppers are lifted from pit with shop-built hook placed on fork lift truck.

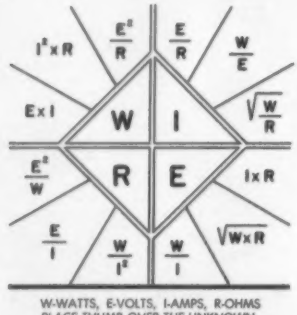
Use of the self-dumping hoppers, manufactured by Roura Iron Works, Inc., also pays off in reduced manual labor at scrap bin.

Do You Have Trouble Remembering Electrical Equations?

PLANT ENGINEERS usually do not work with electrical expressions every day and some may have trouble recalling exactly which one to use for a particular situation. To further complicate matters, the need frequently arises when working in some remote part of the plant. Little can be done until he returns to his desk where this information is kept in handy references.

You can solve this problem by cutting out this handy little guide and carrying it with you. If you mount it on cardboard and fold it in half it will fit nicely inside your billfold.

If you prefer, you can get a cardboard version of this guide by writing to Minnesota Electrical Association, Inc., 521 South Seventh Street, Minneapolis, Minnesota. They will furnish any quantity at a cost of ten cents each to cover handling and mailing. Get extra copies for your electricians.



W-WATTS, E-VOLTS, I-AMPS, R-OHMS
PLACE THUMB OVER THE UNKNOWN, SELECT FORMULA IN THAT ANGLE

Power Factor is the Ratio of True to Apparent Power $\frac{W}{VA}$

Determining kw from a watt hour meter
Watts = rpm of disc x 60 x K.H.
(K.H. is constant printed on meter name plate)

EVERYDAY INFORMATION

Area of a Circle—Diameter squared x 0.7854

Area of a Triangle—½ alt x base

Voltage Drop = $\frac{D \text{ (1 way)} \times I \times 21.5}{CM}$

Converting Temperatures—
(C x 9/5) + 32 = F (F — 32) x 5/9 = C

1 gal water is 8.33 lbs.

1 cu ft water is 62.4 lbs and 7.5 gals.

1 kw will raise 4.1 gals 100F in 1 hour

A 1/32" leak @ 40 lbs will leak 70 gals in 24 hours

Pulleys— $d = \frac{D \times S}{s}$ or $D = \frac{d \times s}{S}$

d = dia driven pulley, D of driving pulley,
s = rpm of driven, S = rpm driving

Cut out and mounted on cardboard, handy guide is right size to fit in billfold.

Armature Failures in Portable Tools

By Stanley Clark, Maintenance Supervisor, U. S. Phoshate Co., Tampa, Florida.

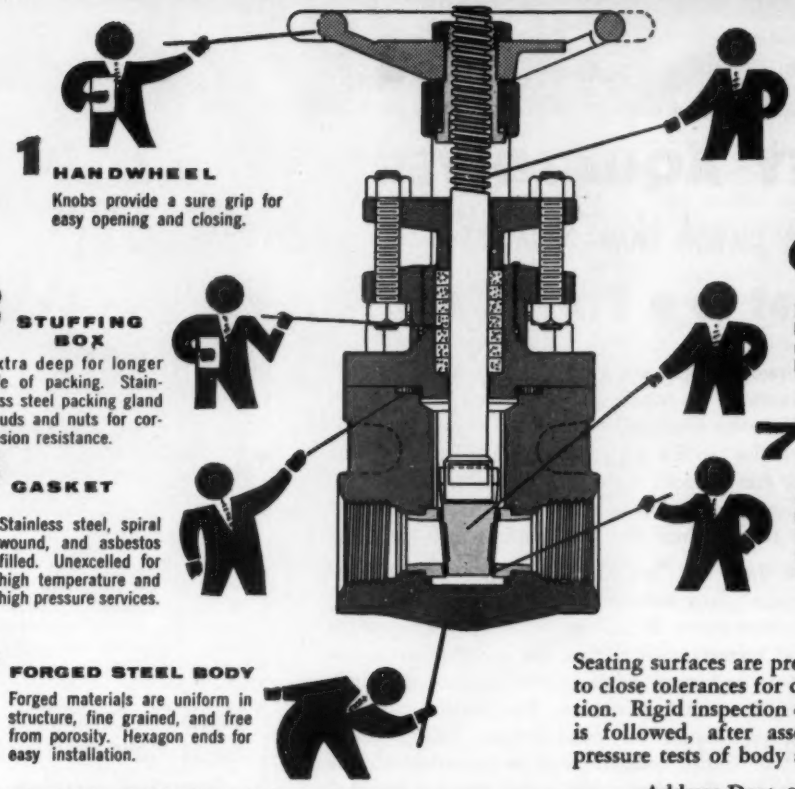
INVESTIGATING the cause of several armature failures on portable electric saws, we found that workmen commonly used three and sometimes four 50-ft extension cords to reach the nearest electrical outlet. The resultant voltage drop reduced the torque available and the saws were frequently stalled in the cut. Stalling causes excessive current flow and burned out armatures.

Our remedy consisted of install-

150-800 POUNDS SERVICE
2000 POUNDS COLD, W.O.G.
SIZES ¼" THRU 2"

A NEW Vogt

with 7 superior features



1 HANDWHEEL

Knobs provide a sure grip for easy opening and closing.

2 STUFFING BOX

Extra deep for longer life of packing. Stainless steel packing gland studs and nuts for corrosion resistance.

3 GASKET

Stainless steel, spiral wound, and asbestos filled. Unexcelled for high temperature and high pressure services.

4 FORGED STEEL BODY

Forged materials are uniform in structure, fine grained, and free from porosity. Hexagon ends for easy installation.

5 STEM

13% Chrome stainless steel. A special high melting point alloy yoke nut assures prolonged wear resistance.

6 WEDGE

13% Chrome stainless steel of approximately 500 Brinell for longer wear.

7 SEATS

13% Chrome stainless steel, hard faced with *HAYNES STELLITE or equivalent for stubborn resistance to seat wear.

Seating surfaces are precision machined to close tolerances for drop tight operation. Rigid inspection of finished parts is followed, after assembly, by final pressure tests of body and seats.

*Trade mark of Union Carbide Chemicals Co.

Address Dept. 24A-FPLE.

Vogt

GENERAL GP PURPOSE

Vogt FOR BETTER VALVES

HENRY VOGT MACHINE COMPANY, Louisville, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati.

FORGED STEEL

VALVES

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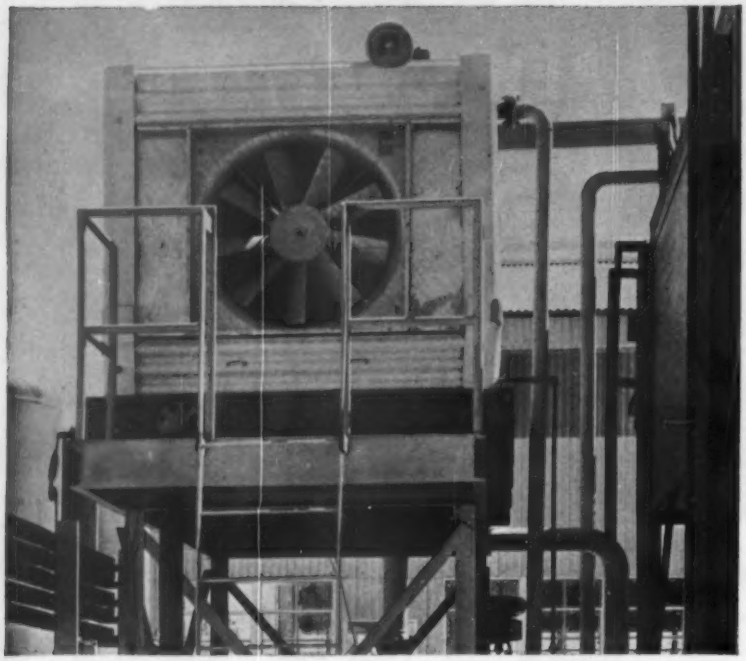


MARLEY AQUATOWER®

adds the punch that changes a

Hot Spot to a Profit Spot

Marley Aquatowers (there are a broad range of types and capacities) are adaptable to many unusual services that add flexibility and profitability to plant operation. The one pictured here is working "in series" with a large air-cooled heat exchanger. After the exchanger has reduced water temperature sufficiently for major requirements, a portion of the flow is cooled further by the Aquatower for a minor but important plant function.

In every plant there are "hot spots" that Aquatowers can change to "profit spots." Any service requiring 25 gpm or more can usually benefit from water at uniform temperature supplied by Aquatowers, and *conservation carries the cost.* Aquatowers are in use throughout industry today providing cooling water for such varied requirements as welding equipment, molding presses, quenching operations, air conditioning, refrigeration, processing, etc. Their initial cost, as well as installation and operation costs, is so low that they make water wasting impractical and unprofitable.

Get complete information on all types and capacities of Marley Aquatowers (there is one that is pinpointed for your job) from the Marley engineer in your city or write to

MARLEY

The Marley Company

Kansas City, Missouri

For more facts circle 542 on Reply Card

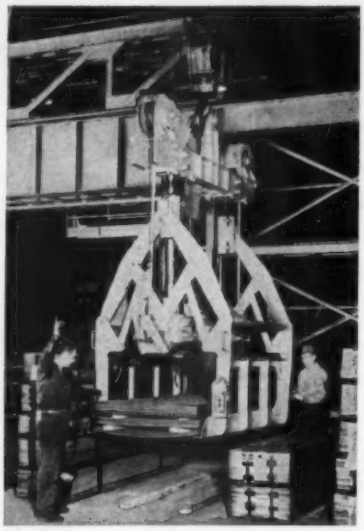
OPERATION—PRODUCTION

(O and P begins on page 52)

ing additional outlets close to the work and instructing the men to use only one extension. Where this was not practical, a special heavy extension was supplied to reduce the voltage drop. The workmen now have a good understanding of the effects of voltage drop and use the heavy cables when needed.

The improved voltage at the saw makes cutting easier and has reduced maintenance substantially.

Lifter Speeds Sheet Handling



Loads of sheets weighing up to 30,000 lb are moved quickly and safely with this Heppenstall motorized sheet lifter at the Cleveland works of Jones and Laughlin Steel Corporation. Push-button controls are mounted on the unit to open and close the lifter arms.

Simple Fire Cutoff Valve Guards Flammable Liquids

REQUIRING NEITHER a complex system of counterweights nor interior bellows, a simple fire protection cutoff valve is used at American Cyanamid Warner's plant at Linden, New Jersey, to handle a wide range of corrosive flammables.

Design of the unit consists essentially of a modified bolted-bonnet gate valve, held open against two exterior springs by a small fusible link. The springs snap the valve

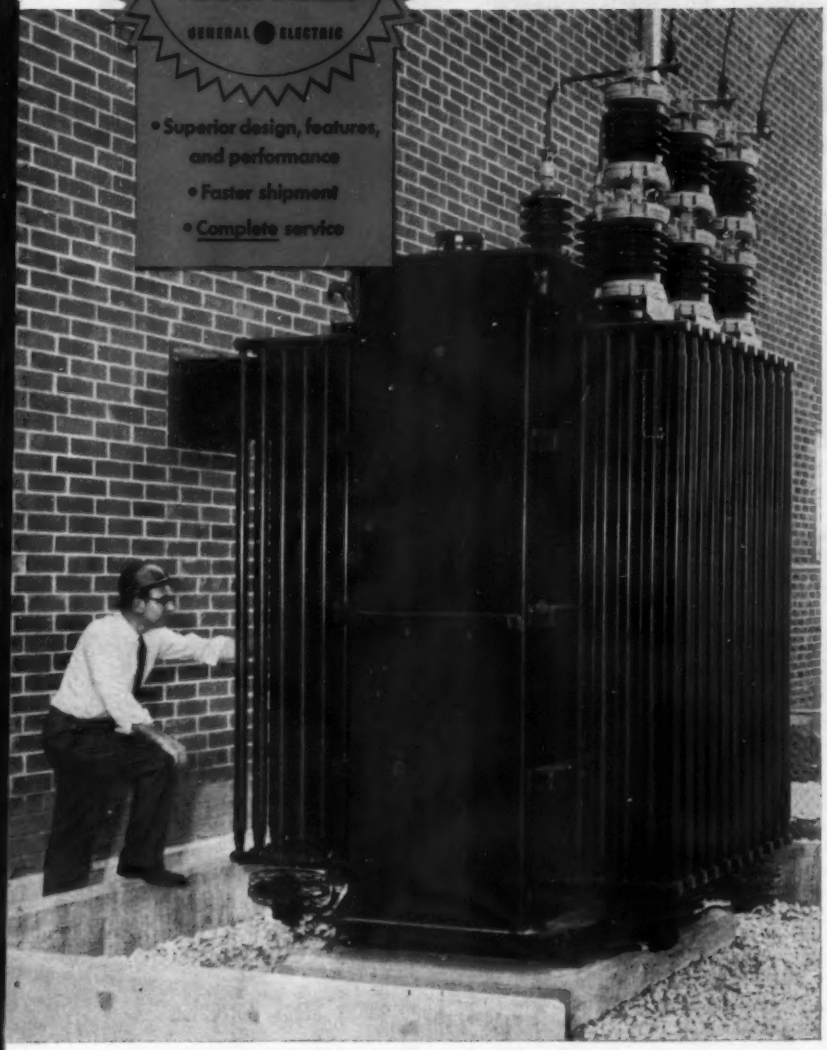
For more facts circle 543 on Reply Card▶

***FULL VALUE* FOR YOUR TRANSFORMER DOLLAR**

8-wk shipment, 4-hr installation with G-E RM medium transformers

FULL-VALUE CERTIFIED TRANSFORMER
GENERAL ELECTRIC

- Superior design, features, and performance
- Faster shipment
- Complete service



Shipment in eight weeks; installation in four hours. These are examples of the full value for your transformer dollar you get with General Electric RM (repetitive manufacture) medium transformers. Maintenance time also is reduced on these units.

For industrial users whose primary or secondary power load exceeds 500 kva, General Electric RM medium transformers offer many advantages. Now RM medium transformers feature interchangeable transformer-breaker bushings, lower sound levels, and improved pressure-relief devices. Other units in G.E.'s full line of transformers meet specialized industry requirements.

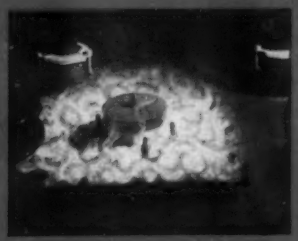
Faster order handling and shipment plus product leadership are key reasons why you get certified **full value** for your dollar with General Electric's full line of transformers for industry*. But be sure to factor in the complete G-E service provided before, during, and after installation. If you examine the **complete package,** we're confident you'll recognize the full value for your transformer dollar offered by General Electric.

For complete information and application help, see your G-E Apparatus Sales Engineer or Agent today. Or write for descriptive literature to Sect. 417-7, General Electric Company, Schenectady 5, New York.

* **Medium transformers (501 to 7500 kva), Open dry-type transformers (300 to 7500 kva), Sealed dry-type transformers (300 to 7500 kva), Distribution Equipment transformers (112½ to 500 kva), Integral Distribution Centers.**

Progress Is Our Most Important Product

GENERAL ELECTRIC



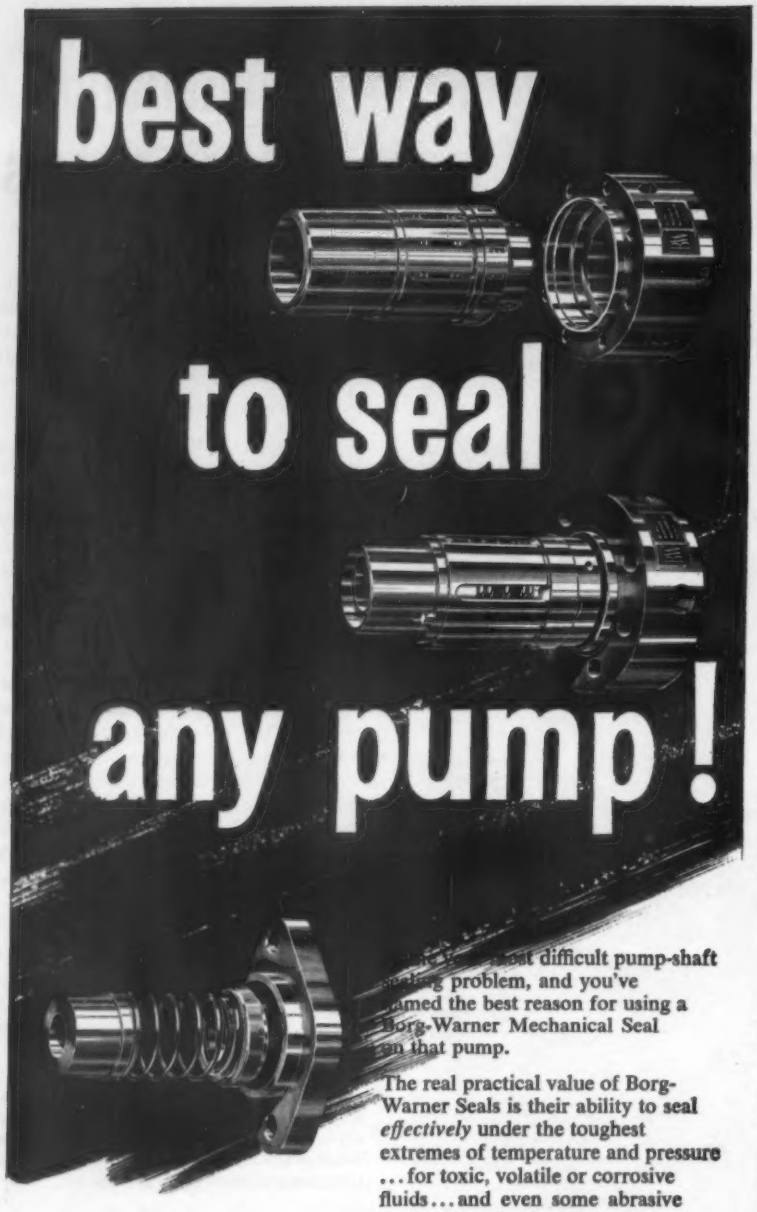
SUPERIOR DESIGN, FEATURES, PERFORMANCE of General Electric transformers is typified by new pressure relief device (left), and interchangeable transformer-breaker bushings.

TBI
GENERAL ELECTRIC

FASTER SHIPMENT through rapid processing of orders . . . computer design . . . repetitive manufacture.

COMPLETE SERVICE . . . application engineers . . . installation engineers . . . 50 nearby service shops.

best way to seal any pump!



...at difficult pump-shaft ...g problem, and you've ...med the best reason for using a Borg-Warner Mechanical Seal ...n that pump.

The real practical value of Borg-Warner Seals is their ability to seal *effectively* under the toughest extremes of temperature and pressure ... for toxic, volatile or corrosive fluids... and even some abrasive liquids. *Result*—less down time, elimination of expensive stuffingbox maintenance, and savings of the pumped fluid.

Borg-Warner Mechanical Seals

NOW AVAILABLE—a new file folder of Borg-Warner Mechanical Seal designs shows some of the many types and applications possible for pumps, mixers, autoclaves and for special rotating shaft problems. Send for your copy today—there's no obligation!

A PRODUCT OF B-W BORG-WARNER

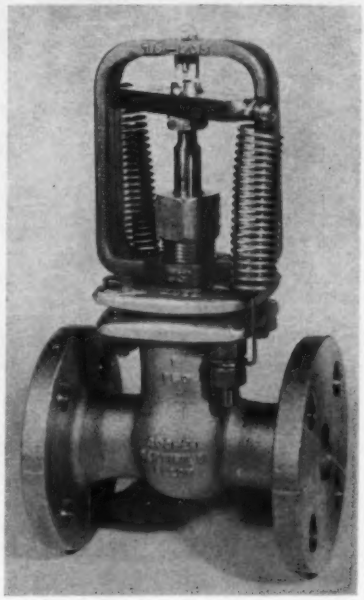
Borg-Warner® Mechanical Seals

P. O. Box 2017, Terminal Annex, Los Angeles 54, California

For more facts circle 544 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)



When fusible link at top of stem melts, stainless steel springs close the valve.

shut, preventing the flow of liquid to fire areas, when the fusible link reaches a melting temperature of 160 F.

Valves are used in lines below storage tanks containing such combustibles as ethyl mercaptan, ethyl alcohol, methanol, acrylonitrile and methyl ethyl ketone. Produced by Cooper Alloy Corporation, Hillside, N. J., the valves are made of 316 stainless to resist both interior and exterior corrosion. They can be used at pumping pressures up to 150 psi.

Lead Spray Stops Corrosion

WHILE MAKING a routine inspection on a heat exchanger used on a 45,000 kva transformer, it was found that there was considerable eating away of the one-inch-thick steel headers in which 222 five-eighths-inch copper tubes are inserted. The steel headers were eaten away to a depth of over ⅛ in.

Following discussions with experts in protective coating problems, it was decided to metallize with lead wire and then impregnate

THERE MUST BE AN EASIER WAY

DRAFTING ROOM'S DARKEST HOUR— ANOTHER SET OF DRAWINGS TO BE "ONLY SLIGHTLY MODIFIED"
ALL OF THESE WILL HAVE TO BE RETRACED TO GET THE CONNECTING RODS LARGER
IF WE CAN'T HIRE EXTRA DRAFTSMEN THIS WILL TIE US UP FOR WEEKS
I FORGOT WHAT IT'S LIKE TO WORK ON NEW DESIGNS, ALL I DO IS RETRACE OLD DRAWINGS
I FEEL LIKE A GREAT BIG RUBBER STAMP
MAYBE YOU CAN GET SOME GUYS FROM BARNUM AND BAILEY WHO CAN DRAW WITH THEIR HANDS AND TOES
THIS DOES IT! I'M TAKING A JOB WHERE THEY HAVE A BLUEPRINTER MAKE AUTOPOSITIVE PAPER INTERMEDIATES INSTEAD OF RETRACING

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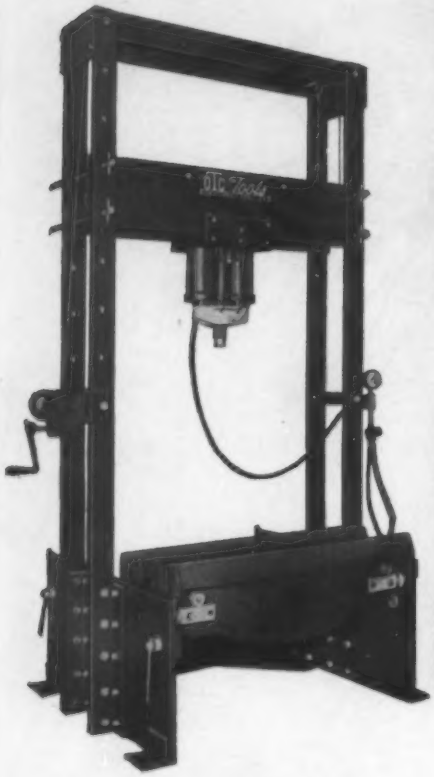
Unique OTC Roll-Bed Hydraulic Shop Press Positions Work Quickly, Easily:



Bed is rolled *outside* the press frame to receive the unload hard-to-handle work.

One man easily rolls the bed and the work into position under the hydraulic ram.

Ideal for hard-to-handle work, the unique OTC *Roll-Bed* Hydraulic Shop Forcing Press permits overhead crane loading to bed which is outside the press frame — then work is rolled smoothly under the hydraulic ram. Unloading is just as easy. Rugged design of base, smoothly running rollers eliminates back breaking, dangerous loading, saves time. Cross head is adjusted to any height with winch — tapered pins lock it securely — trolley allows horizontal adjustment of ram for off-center work. Open sides admit long bars for straightening or bending. In 50 and 100 ton capacities, 8 ft. and 10 ft. high respectively, powered by manual or electric pumps. Other OTC Shop presses from 17½ to 50 ton capacities. See Sweets Plant Engineering File 2j.
Ow

Detachable Hydraulic Ram and Pump

Power-Twin *Center-Hole* rams and pumps on all OTC Shop Presses are detachable for use with OTC pullers for other maintenance work.

See Your Distributor or Write

OWATONNA TOOL CO.

446 Cedar St., Owatonna, Minnesota

RESEARCH · ENGINEERING · DEVELOPMENT

OTC

Designers and manufacturers of the world's most complete line of Maintenance Tools and Hydraulic Equipment.

For more facts circle 546 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

the metallized surface with a phenolic sealer. The first step was to make up wooden plugs for the copper tubes in order to protect their expanded ends while sand blasting and also to prevent sprayed metal from entering the tubes while metallizing.

Following sand blasting, lead wire was sprayed on to a thickness of approximately 0.030 in. Lead was chosen for this job because of its lower electrochemical series value.

After metallizing, the phenolic sealer was applied. Since all metallized coatings are somewhat porous, several coats were applied until the lead could no longer absorb the sealer.

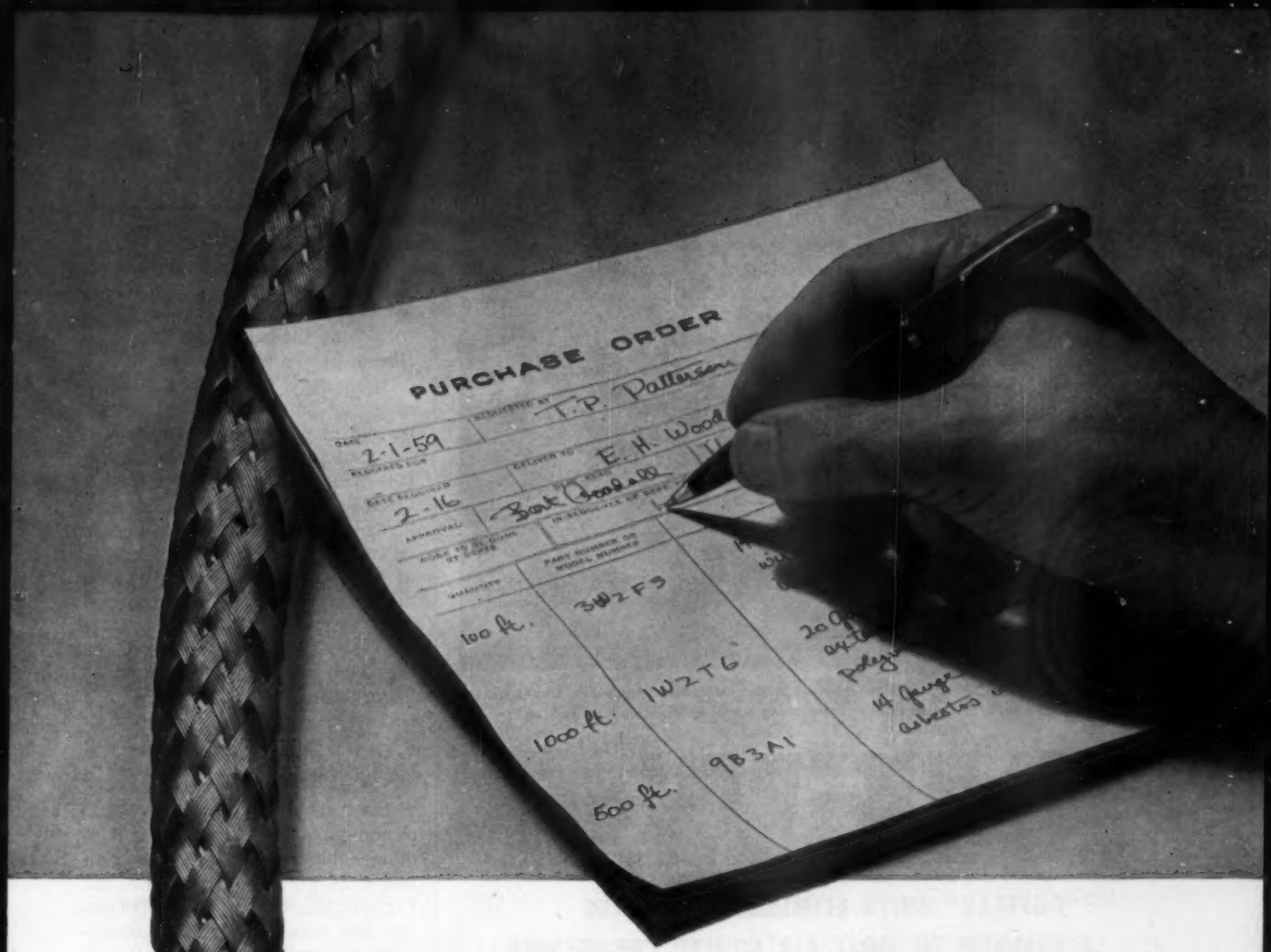
After plugging tubes and protecting flange, lead wire is sprayed on header.

Results obtained with this method have proved excellent. A recent inspection of the heat exchanger showed no evidence of rust or deterioration of the coating.

Tray Stops Locker Bottom Rust

By Stephen Popowich, The Carborundum Co., Niagara Falls, New York.

RUSTING of the bottoms of plant lockers has been a long-standing problem at Carborundum. For many years this has been attributed to water remaining on the floor after the locker room floor has been hosed down. Recently it was suggested that the cause might be salt



Write your own ticket for Honeywell thermocouple wire

Choose from over 100 variations of insulated thermocouple wire and thermocouple extension wire. Honeywell can supply it from stock, with insulation in any of the conventional combinations of asbestos, glass, polyvinyl, Teflon and others. Should your application require other than conventional insulation, Honeywell can custom-make what you need, quickly and economically.

Call your local Honeywell field engineer . . . he's as near as your phone. Or write for Buyer's Guide C100-8.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

First in Control

"Buffalo" Air Cooled Condensers. Shipped as factory-assembled packages. Capacities from 7½ to 100 tons based on 120° condensing temp. 40° suction, 100° ambient.

NEW

"BUFFALO" UNITS ELIMINATE TROUBLES COMMON TO MOST AIR COOLED CONDENSERS

1. **Minimum Service Requirements** proved in field.
2. **The "Buffalo" "By-Pass Damper Control of Head Pressure"** eliminates many problems inherent in "Balancing Valve Pressure-Regulated Controls". The "Buffalo" design maintains effective head pressure control at reduced load, or with sharp day-night temperature fluctuations. It also prevents over-cooling at low level with low ambient.
3. **Operating Difficulties Reduced to Absolute Minimum.**
4. **Compressor Stays on Line.** Horizontal discharge type units are easily affected by wind, even when deflectors are used. Under certain conditions effective air velocity over coil is so reduced that compressor cannot be kept on line.
5. **The "Buffalo" Control System Requires Considerably Less Refrigerant Charge** than "Flooded Coil Control". Result: Important savings on expensive Freon.
6. **"Buffalo" Units Provide Greater Evaporative Tonnage** (effective air conditioning load) than most other types.

"Buffalo" Air Cooled Condensers offer many other advantages which cannot be covered in this limited space. Your nearby "Buffalo" engineering representative will be glad to give you the full details. Phone him today, or write us direct.

BUFFALO FORGE COMPANY
166 Mortimer Street • Buffalo, N. Y.
Buffalo Pumps Division, Buffalo, N. Y. • Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

INDUSTRIAL EXHAUSTERS • BELTED VENT SETS • PROPELLER FANS • "E" BLOWERS-EXHAUSTERS
For more facts circle 548 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

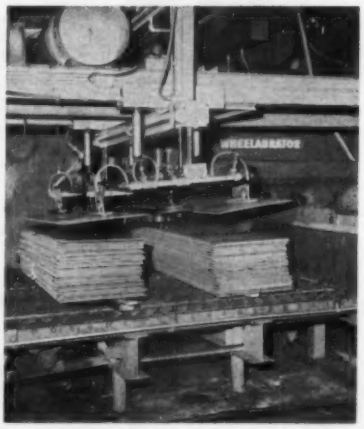
or other corrosive draining from the wet footwear of the men during winter months. A check on locker conditions indicated that this conclusion was correct.

To remedy the situation, a small collecting tray was placed in the bottom of each locker. The tray is designed to fit freely in the locker. It is open in the front and the other three sides are about one half inch high. The material used may be either stainless steel or a good grade of galvanized sheet steel. In addition to protecting the locker bottoms against corrosion, the trays save time when cleaning because they can be removed and dumped like a dustpan.

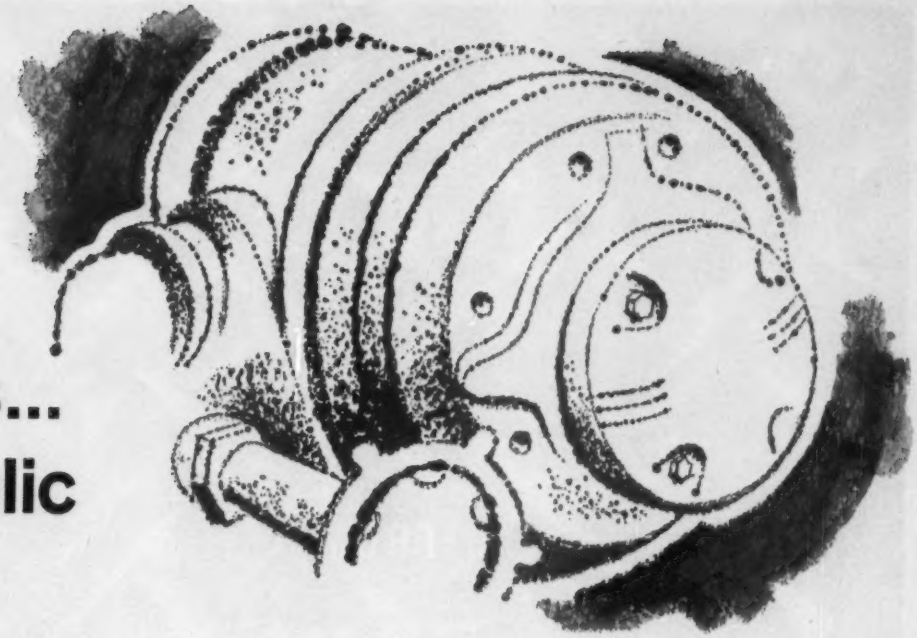
Vacuum Lift Reduces Labor

STEEL SHEETS are fed into and discharged from an airless blast cleaning machine by automotic handling equipment designed by engineers of the Rockwell-Standard Corporation, Utica, N. Y. The system uses vacuum cups to automatically pick up a sheet and deposit it on the machine apron at the feed end. At the discharge end of the machine, a similar unit picks up the sheet from the machine conveyor and loads it onto a truck.

Designed to work with a Wheelabrator airless blast cleaning machine, the new system can handle 30 tons of steel in an hour.



Automatic loading device picks up steel sheets and places them on conveyor to be carried through machine.



Pumps... hydraulic oil... and profits

Faulty hydraulic pumps cut production. Rust, varnish and sludge interfere with precise control—in many cases bring a production line to a dead stop and whittle profits. Special inhibitors in Sinclair Duro Hydraulic Oils have earned the reputation for protection against varnish and sludge. Furthermore, Duro's rust inhibitor has a preferential metal-wetting action that forms a tough barrier against water penetration. Next time management asks how you've cut costs, tell them you've switched to Sinclair Duro...and show them the results.

Call your **Sinclair Representative** for further information, or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y.

Sinclair

Sinclair
Duro Hydraulic Oils

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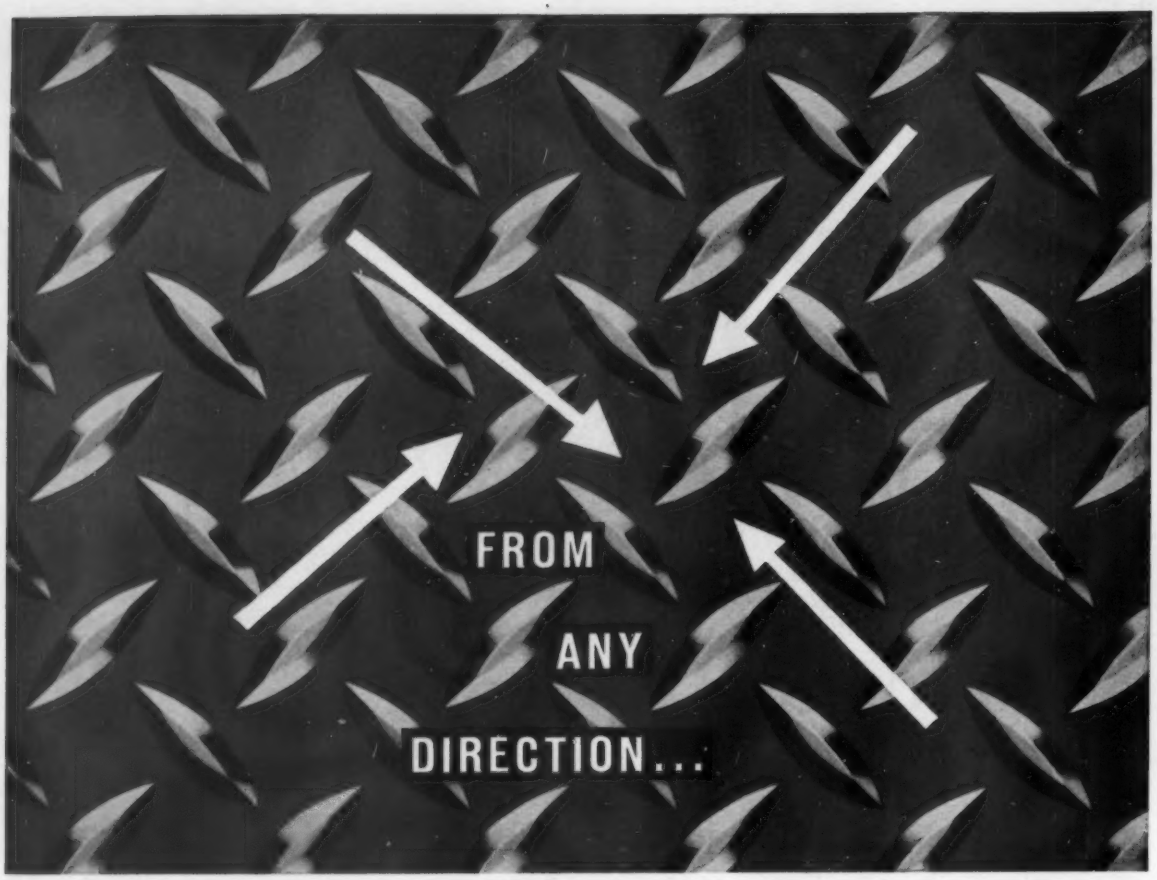

Alan Wood Super Diamond floor plate ...is easy to clean

Sweep it . . . hose it . . . mop it . . . at any angle, A. W. Super Diamond is easy to clean. No pockets to hold dirt or water . . . the unique design of this rugged floor plate lets water drain quickly in any direction.

A. W. Super Diamond is easy to fabricate, too . . . it can be sheared, welded, formed, and easily matched. The arrangement of the exclusive pattern allows you to bend it at any place. This is a heavy duty floor plate that will last for years . . . and provide a safe, non-skid footing.

For easy cleaning . . . for easy fabrication and installation . . . for long wear . . . specify A. W. Super Diamond. Write for Bulletin SD-N3

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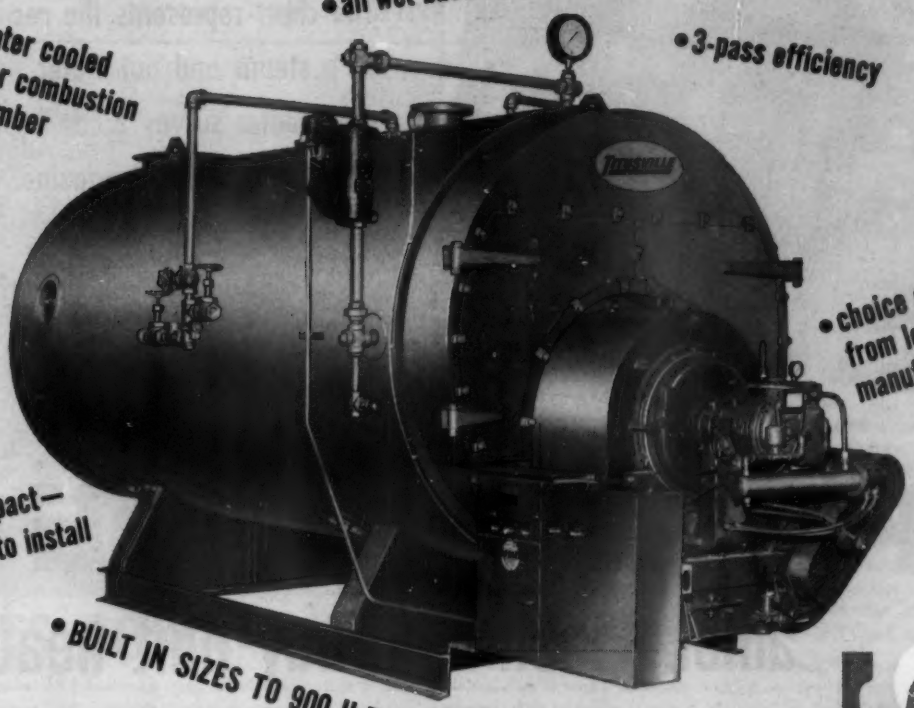
MOST MODERN unit of its type in the industry today!


• all wet back construction
• water cooled rear combustion chamber
• 3-pass efficiency
• choice of burners from leading manufacturers
• compact—easy to install
• BUILT IN SIZES TO 900 H.P.

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3-PASS UNIT

FOR POWER AND HEAT

Just off the press—fully descriptive folder plus specification and rating sheets. Send for your copy.

This is the Titusville 3-Pass Unit that is acclaimed everywhere for truly outstanding performance and economy in steam production. Efficiencies greater than 80% are achieved in normal operation, with maintenance costs at new lows even for Titusville. Get the TITAN facts now—and compare! Write us.

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BOILER DIVISION: BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units. **PROCESSING EQUIPMENT DIVISION:** Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels . . . Synthesis Converters. **FORGE DIVISION:** Crankshafts . . . Pressure Vessels . . . Hydraulic Cylinders . . . Shafting . . . Straightening and Back-up Rolls

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Plants at Titusville, Pa. and Warren, Pa.
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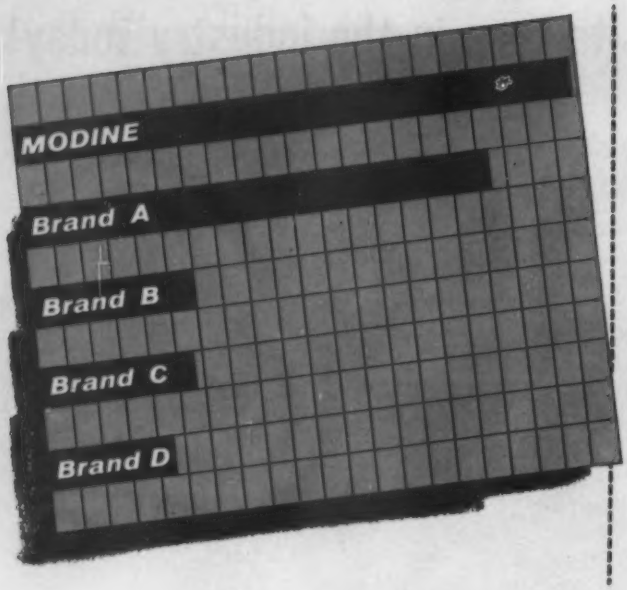


The chart represents the results of a steam and hot water unit heater survey made by a leading industrial magazine. In answer to the question "Which brand do you prefer?", Modine was a solid . . .

FIRST CHOICE

among men who buy unit heaters

HORIZONTAL
Can be direct-from-pipe suspended . . . without other supports. Vertical louvers may be added for complete directional control. 24 sizes.

VERTICAL
Available in 28 sizes . . . choice of 4 air deflectors. Depending upon size selected, mounting height may vary from 10 to 60 feet.

POWER-THROW®
For hard-to-heat locations. High-velocity discharge assures exceptionally long heat-throw . . . up to 140 feet. Offered in 10 sizes.

For over thirty years, Modine steam and hot water unit heaters have been a consistent first choice for commercial and industrial applications. They're ideal for new buildings or modernization . . . pay off in perfect comfort, at low fuel costs, with minimum maintenance.

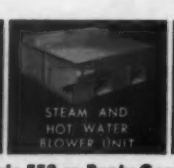
Here are just a few of the features of Modine's line: attractive styling; three distinct designs . . . horizontal, vertical, Power-Throw; lightweight, yet extremely durable construction; high capacity on steam or hot water systems; die-formed casings; a complete line of low-outlet-temperature models for high pressure systems; extra-heavy die-formed fins for added strength and maximum heat transfer; vertical fin design that discourages accumulation of dust and dirt.

CATALOG 158 *contains full details. See your distributor or write Modine Manufacturing Co., 1563 DeKoven Ave., Racine, Wisconsin.*
In Canada: Sarco Canada, Ltd., Toronto, Ont.

Immediate delivery from local stock!
Modine wholesalers are located in all principal cities. Call the Modine representative nearest you . . . he's listed in the yellow pages.

SU-1388

Also from the world's most complete unit heating line



Modine
FIRST NAME IN UNIT HEATING

For more facts circle 552 on Reply Card

For more facts circle 553 on Reply Card →

first in silicones

Dow Corning

SILICONE NEWS

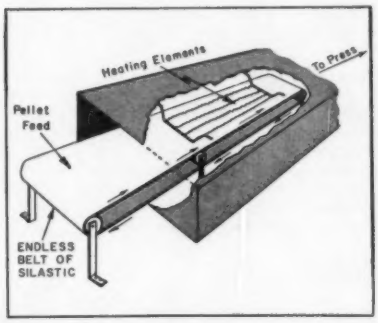
production and maintenance edition • No. 29

CUTS DOWN-TIME & CLEANING

Contamination build-up on electrical insulators usually means double trouble. It can cause service interruptions and it also creates a cleaning problem. If these are your problems, you'll want to learn what one company did to solve them. Alpena (Mich.) Power Co. has lines adjacent to the world's largest single cement plant. Air-borne cement dust, being extremely tenacious, can build up quickly on the pole line insulators and cause flashovers. The old method of checking the problem was to remove the contaminated insulators and send them to the maintenance shop for a scrub job. In addition, larger 65 kv insulators were installed on the 34.5 kv lines to reduce flashovers and increase the interval between cleanings slightly. Alpena Power men had almost accepted this as standard practice when they tried the following experiment.

They applied a silicone coating of Dow Corning 5 Compound to three of four insulators in an area where cement dust was heavy. The fourth insulator was wax-coated. After seven months all were cleaned without being removed. The three silicone coated ones were easily wiped clean with dry rags in a total time that was only a fraction of that required to clean just one wax-treated insulator with solvents and steel wool! Further testing bore out the superiority of Dow Corning 5 Compound.

As a result, Alpena Power is sold on silicones for its insulators. The silicone compound makes possible fewer cleanups, faster cleanups, reduced man-hours, and fewer outages of shorter duration. *No. 298*



"STICK-PROOF" RUBBER

Ever wish for a rubber that plastics or other materials would not adhere to at oven temperatures? Look no further . . . you'll find it in this story from B. F. Goodrich Footwear and Flooring Co., Watertown, Mass.

The process: making products of vinyl plastics. The problem: pre-heating vinyl pellets before they reach the presses. The pellets are carried on an endless belt through a tunnel oven. Of what material should this endless belt be made? It must be flexible. It must stand heat.

Originally, B. F. Goodrich used a belt made of wire mesh. Scheme of arrangement is shown at left. But, this belt presented problems; fines in the vinyl pellets filtered through the mesh and were carried along the lower return pass. Accumulating on the head and tail pulleys, the gummy fines soon caused belt distortion, eventually untracking the belt. This meant frequent shutdowns for cleaning.

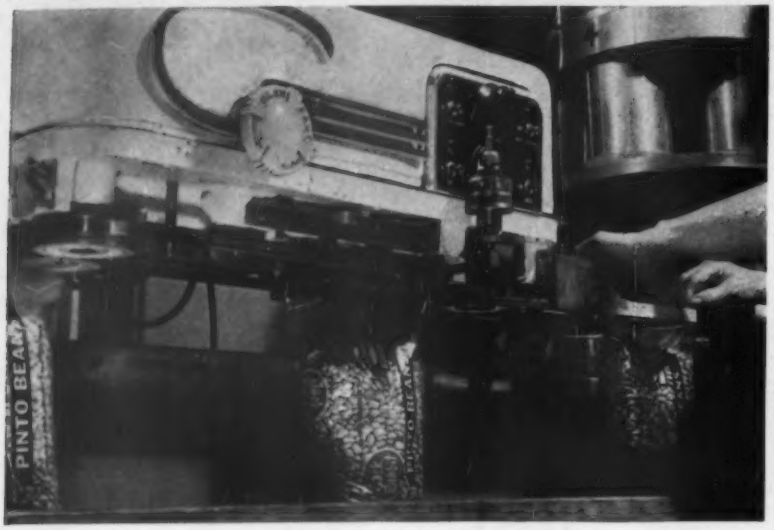
So, B. F. Goodrich tried something new. They bought a wire mesh belt impregnated with Silastic®, the Dow Corning silicone rubber. Chase-Walton Elastomers did the impregnation on the 4′ 8″ by 13′ 6″ belt. This different approach paid off . . . the new belt went into operation in late 1956, and it's been running without a hitch ever since. Despite repeated, long-time exposure to the 160-180 F temperatures required to soften the vinyl pellets, the Silastic belt stays flexible and rolls along without hindrance from gum-ups!

If you need a heat-resistant, flexible solid somewhere in your plant, why not look at Silastic? *No. 299*

INSULATED FOR OVERLOADS

No matter how smoothly a motor runs in ordinary service, it could burn out in short order if given a rapid reversing job. To prevent this, your best bet is to do what Cadillac Gage of Detroit did.

At Cadillac, drive units installed on several pieces of machinery were giving trouble. The units—1 hp, 1800 rpm Class A motors—were put on jobs calling for as many as 100 reversals per *(Cont. Pg. 2)*



HOT TIP FOR PACKAGERS

Bean-bags are no game but serious business to the machine you see here. And in this smooth packaging operation lies quite a story. If you have any heat-sealing machinery or other hot surfaces that tend to get "gunked up", this story should be of real interest.

Michigan Bean Co. (Saginaw, Mich.) operates the world's largest bean elevator, and markets its many products under the Jack Rabbit label. These beans—and peas, and lentils—are packaged in polyethylene for eye-appeal on store shelves.

The polyethylene bags are formed, filled, then sealed shut on the equipment shown. And it was here that Michigan Bean found a bottle-neck. During heat-sealing by the high-temperature band type sealers, the plastic tended to decompose slightly and form a sticky build-up on the bands. This, naturally, prevented proper closure of the bags and slowed production.

Michigan Bean found a way to beat the build-up by applying silicones. A felt wick applicator and fluid reservoir were fitted on the machines. The wick now spreads a Dow Corning silicone release agent on the bands at a rate of about three drops per minute. Result? No more plastic build-up . . . the bags release smoothly.

Vertical bag-filling machines are also now treated with silicones. Though Michigan Bean has put Teflon tape on the bag chutes for good slip, production men find they get still greater insurance against jam-ups if they coat the tape occasionally with a silicone release agent.

Is there a place in your plant where the famous "slip" and heat resistance of silicones can help? *No. 300*

INSULATION *(Continued)*

minute. This created too much heat for the insulation and motors burned out quickly.

Cadillac Gage found the best way to beat the heat was to have the motors rewound with insulation made from Dow Corning Silicones. The superior heat stability of silicone insulation enables the motors to carry overloads that quickly destroyed previous insulating materials.

Result: not a bit of trouble has been reported since the silicone rewinds were put to work. In fact, Cadillac is so pleased with its first silicone rewinds, it has since had several other motors rewound by Howard Electric Co. of Detroit with silicone insulation. *No. 301*

new literature and technical data on silicones

A Full Color, sound movie lets you see how silicone insulated motors are wound. A step by step procedure depicts why silicone rewinds are premium quality. Case history information shows how silicone insulation virtually eliminates motor failures and reduces maintenance costs as it increases production in different manufacturing plants. For information on how to obtain this movie for showing in your plant, check *No. 302*

On the Spot sealing, encapsulating, caulking or potting can be done with Silastic RTV, the Dow Corning silicone rubber that vulcanizes at room temperature. Available in several consistencies, ranging from that of caulking compound to a pourable fluid, Silastic RTV sets up in minutes . . . forms a resilient solid. Its use in forming flexible molds, waterproofing outdoor electrical connectors, sealing flush access doors or windows of pressurized interiors, as well as many other applications are described in pamphlet form and available to you as . . . . . *No. 303*

Surface-Maintenance Money Saver . . . Silicone-based paints provide up to 200% longer service life — greater protection. Illustrated case histories show equipment that has been kept rust-free and attractive longer. Superior weathering properties, heat stability and resistance to corrosion are offered by paints formulated with Dow Corning silicone resins. Complete information is available in this new, up-to-date, 4-page brochure . . . *No. 304*

Guide to Dow Corning Silicones is a comprehensive and concise review of silicone products for all industries. You'll find information on new materials that serve to reduce production and maintenance costs and improve product design. Silicone materials such as defoamers, rubber, release agents, packaging materials, lubricants, protective coatings, electrical insulation, and a variety of others are included in this Guide. *No. 305*

Performance-Proved Dow Corning silicone lubricants can help you solve problems created by adverse operating conditions. Designed for reliable service over wide temperature spans, specialized Dow Corning silicone lubricants are used on equipment ranging from freezers to core oven conveyors — at temperatures as low as −100 F, as high as 500 F. Properties and applications for silicone oils and greases are compiled in an 8-page brochure. . . . . *No. 306*

Dow Corning Corporation, Dept. 969, Midland, Michigan
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TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE ___ STATE _____

SILICONE NEWS is published for production and maintenance men by

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

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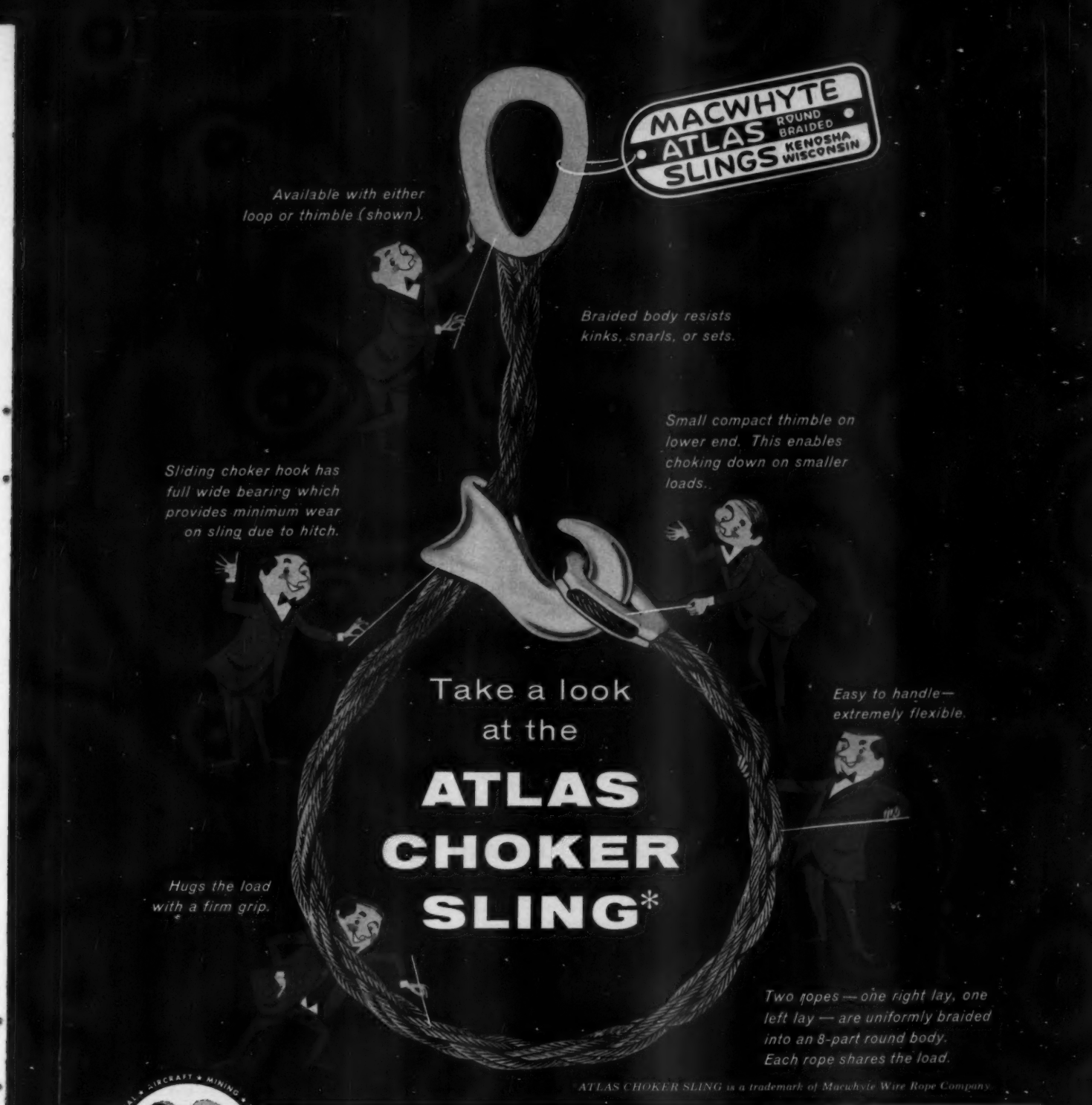
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Available with either loop or thimble (shown).
Braided body resists kinks, snarls, or sets.
Small compact thimble on lower end. This enables choking down on smaller loads.
Sliding choker hook has full wide bearing which provides minimum wear on sling due to hitch.
Take a look at the
ATLAS CHOKER SLING*
Easy to handle—extremely flexible.
Hugs the load with a firm grip.
Two ropes—one right lay, one left lay—are uniformly braided into an 8-part round body. Each rope shares the load.

ATLAS CHOKER SLING is a trademark of Macwhyte Wire Rope Company

Macwhyte Atlas braided slings are readily available in a variety of standard types and assemblies. If you have a *special* load-handling requirement, we will furnish Atlas Slings to your design . . . or Macwhyte engineers will gladly give you their design recommendation. There's a Macwhyte representative close by. Ask for your free copy of sling circulars 5308R and 5886.

198

MACWHYTE Wire Rope

2900 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

Manufacturers of wire rope, slings, and cable assemblies. Distributed and stocked throughout the United States

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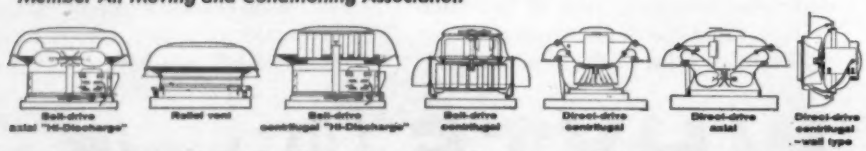
NOW—IMMEDIATE DELIVERY
VIA JENN-AIR
BLUE RIBBON SERVICE

for the exhausters you want . . . when you want them . . . call your Jenn-Air Sales Representative

Waiting for delivery of equipment you need right away can be a schedule-disrupting, money-losing proposition. But you don't have to put up with these delays when it comes to power exhausters. The giant new Jenn-Air warehouse shown above is stocked with all sizes and models of Jenn-Air Quiet-Tested Exhausters . . . ready to ship as soon as your order comes in. Chances are you can get immediate delivery even on large quantity orders.

There has never been any compromise with quality in the manufacture of Jenn-Air products. The best of materials and the utmost skill are a part of every unit from engineering through production to final "Vibronic Eye" testing. Now this Blue Ribbon Jenn-Air quality is teamed up with Blue Ribbon immediate delivery service to make Jenn-Air—more than ever—first choice among ventilating equipment specifiers.

Member Air Moving and Conditioning Association



JENN-AIR

Jenn-Air Products Company, Inc. • **1102 Stadium Drive, Indianapolis 7, Indiana**

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STOCKPILING: Piling up coal reserves in Milwaukee. AMERICAN 300 Series Crawler Crane.

SWITCHING: Moving gondolas, loading steel wire in Illinois. AMERICAN DiesELectric Locomotive Crane.

YARD DUTIES: Sorting steel of all shapes and sizes in St. Paul. AMERICAN 300 Series Self-propelled Crane.

UNLOADING: River traffic flows steadily in St. Louis. AMERICAN 700 Series Pedestal Crane.

WHY NOT PROFIT BY THE EXPERIENCE OF OTHER AMERICAN CRANE OWNERS!

One of the most respected, most reliable names in the materials handling equipment field, American Hoist has earned a leading reputation for developing superior load moving machinery. Owners and operators of American cranes can depend on their "years-ahead" engineering features to provide them with efficient load lifting services. Their acceptance of American dependability and versatility is just one more reason why you'll see American cranes in use by more and more of the nation's top industrial firms.

If expensive, single-duty equipment sits idle in your yard, now is the time you should fully examine the potential of multi-purpose American cranes. They can cover a wider variety of jobs than almost any other machine you own. Handling loads of all shapes and types, American cranes are tailor-made for almost every job in your plant or yard. With interchangeable fronts . . . hooks, grapple, clamshell, dragline, shovel or magnet . . . the demands of every industry are met by a complete line of American Cranes. Based on the experience of other American owners and operators, Americans are job tested . . . job proven . . . job ready . . . to help you cut your material handling costs.

Send for free detailed and illustrated catalog information on American Cranes best suited for your requirements . . . crawler, rubber, pedestal, or rail mounted.

AMERICAN HOIST
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EXCAVATORS-CRANES to 2 yds.-60 tons
LOCOMOTIVE CRANES to 130 tons
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REVOLVER CRANES to 400 tons

AMERICAN HOIST PACIFIC COMPANY
Special materials handling equipment

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

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Please send me complete catalog information on American cranes, FREE.
☐ Truck ☐ Self-propelled
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at

Contractor: Roland Thompkins & Son, Inc. Hawthorne, N.Y.

Consulting Engineer: Giffels & Vallet, Inc. Detroit, Mich.

Architect: L. Rossetti Detroit, Mich.

the Comfort Computation

came out . . .

DUNHAM-BUSH

The Dunham-Bush 'HAH' is designed for ceiling installation which conserves space vitally needed for engineering purposes.

Of course, IBM really didn't employ any of its masterfully precise computers to predetermine whose air conditioning equipment would best serve their new Engineering Laboratory at Kingston, New York.

But all equipment selected was calculated to meet the important demands modern industry must make to ensure personnel comfort and equipment protection.

For example, here at Kingston, 92 engineered Dunham-Bush Horizontal Air Handling units efficiently deliver conditioned air to create the climatic interior that's seasonally required. Dunham-Bush units have operational versatility that enables them to cool, heat, filter, or dehumidify air, according to temperature requirements. Additionally, such Dunham-Bush heating products as finned tube radiation with expanded metal covers, horizontal and cabinet type unit heaters, and F&T traps and strainers are used throughout the laboratory.

Contact your nearest Dunham-Bush sales representative for assistance when your next heating or cooling job arises.

You'll find that this one source—one responsibility is of inestimable value.

Close-up of Dunham-Bush 'HAH' which cools, heats, filters, dehumidifies air.

Dunham-Bush, Inc.

WEST HARTFORD 10 • CONNECTICUT • U. S. A.

DUNHAM-BUSH

AIR CONDITIONING • REFRIGERATION • HEATING • HEAT TRANSFER

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SUBSIDIARIES

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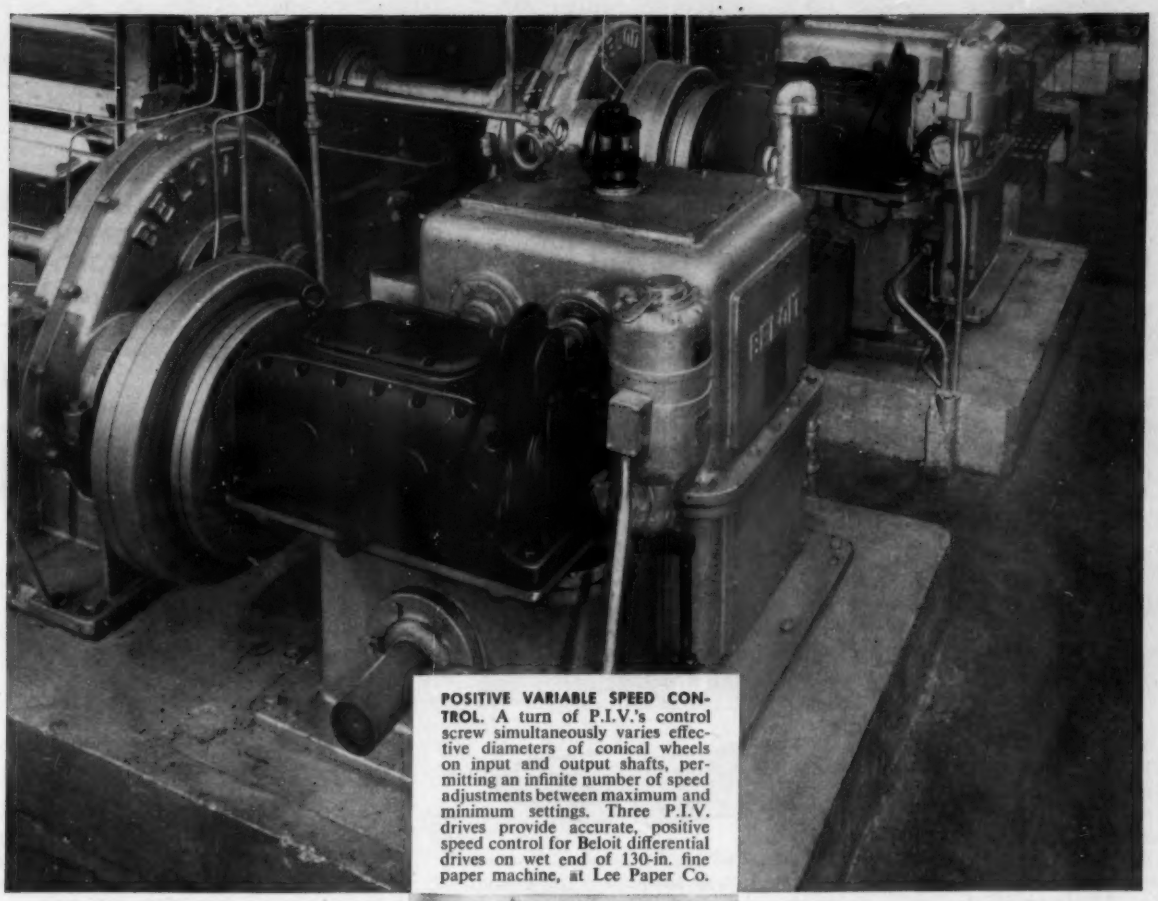
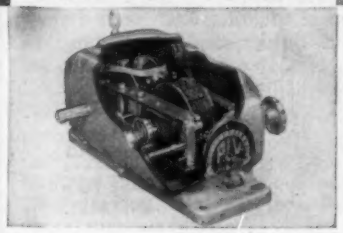


POSITIVE VARIABLE SPEED CONTROL. A turn of P.I.V.'s control screw simultaneously varies effective diameters of conical wheels on input and output shafts, permitting an infinite number of speed adjustments between maximum and minimum settings. Three P.I.V. drives provide accurate, positive speed control for Beloit differential drives on wet end of 130-in. fine paper machine, at Lee Paper Co.



Unique in operation . . .

unmatched in accuracy . . .

For stepless, slipless speed changing

. . . there's nothing like P.I.V.

Where operations requiring variable speed control can't tolerate slip—no other mechanical drive is equipped for the job like Link-Belt P.I.V. With its all-metal, self-tooth-forming chain that maintains positive grip with radially grooved wheels, it offers a degree of accuracy . . . a level of efficiency—unique in the field. Speeds can be varied in an instant, regardless of load, without interrupting the driven machine. And P.I.V.'s all-metal construction ignores atmospheric conditions.

The complete story is contained in Book 2274. Your nearest Link-Belt office or authorized stock-carrying distributor will supply a copy.

P.I.V. LINK-BELT
VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,088

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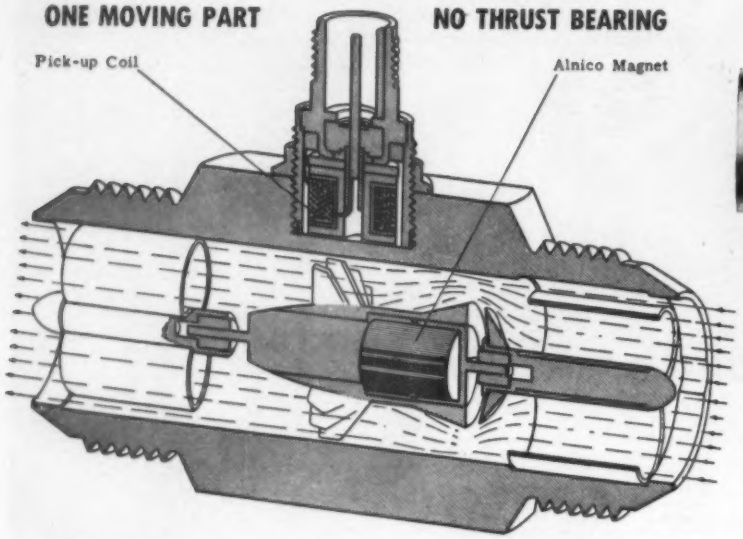
FACTS ABOUT pottermeter BOWSER INDUSTRIAL METERS

TURBINE-TYPE AND POSITIVE-DISPLACEMENT HIGHEST ACCURACY METERS FOR CHEMICAL, PETROLEUM, INDUSTRIAL, LIQUID FOOD AND PHARMACEUTICAL APPLICATIONS

POTTERMETER . . . electronic-sensing turbine type

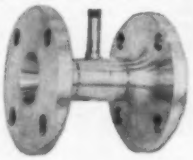
ONE MOVING PART **NO THRUST BEARING**



Pottermeter produces an electric signal whose frequency is accurately proportional to the rate of flow of a liquid through a pipe section. Suitable instrumentation measures this signal to indicate or record the flow, or operate any controls required in a liquid handling operation.

SANITARY FOOD AND BEVERAGE (fast take down)

Quick-coupling stainless steel Pottermeters can be backwashed or easily and completely disassembled for cleaning.



INPLANT OR OUTDOORS

PIPELINE MOUNTING

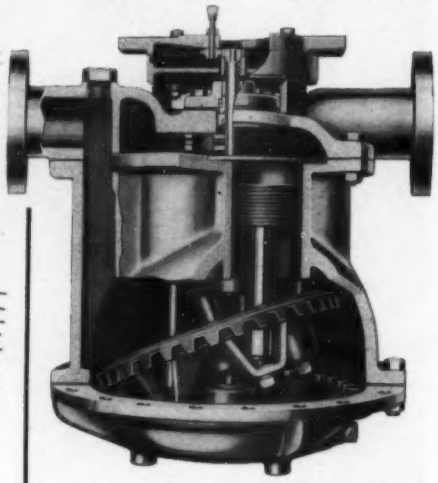
EASY TO INSTALL

Inlet and outlet connections are unlimited as to type and size.

AVAILABILITIES

FLOW RANGES	to 40,000 g.p.m. or more
OPERATING PRESSURES	unlimited
TEMPERATURE RANGES	−455°F. to +1500°F.
PRESSURE DROP	virtually nil
CONNECTIONS	no limitation
CONSTRUCTION (standard)	Type 316 stainless steel

BOWSER XACTO positive piston displacement



Xacto Meters utilizes positive displacement pistons linked with a drive shaft to mechanically operate any one of many types of counters, or to transmit pulses for recording devices or for remote control of the metered liquid.

PROPORTIONING BLENDERS

Xacto Meter equipped. Blend two or more liquids in closed system, continuous production. Also rate of flow controllers to maintain constant control of flow rate automatically.

AVAILABILITIES

FLOW RANGES	6 g.p.h. to 250 g.p.m.
OPERATING PRESSURES	to 500 p.s.i.
TEMP. RANGES	−40°F. to +225°F.
PRESSURE DROP	moderate
CONNECTIONS	to catalog standards

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES

•

WORLD'S MOST COMPLETE METER LINE

INDICATING, RECORDING AND CONTROL AVAILABILITIES

INDICATING devices permit reading at meter or remote locations.

•

RECORDING devices provide file data for permanent records.

•

CONTROL devices enable liquid process automation for batching, blending, packaging, etc.

Both Xacto Meters and Pottermeters provide the basis for improved liquid control systems. New readout devices, both mechanical and electronic, adapt to these meters. A Pottermeter-Bowser sales engineer will gladly confer on your metering requirements at your request.

WRITE FOR CATALOG DATA FOLDERS

•

SPECIFY LIQUID TO BE METERED

POTTER-BOWSER DIVISION... BOWSER, INC.

MARKETING DIVISION FORT WAYNE, INDIANA

For more facts circle 559 on Reply Card

COURT DECISIONS —a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Right to Rocket Invention

IN NEW YORK STATE, the widow of the inventor of a hand-operated rocket device for signalling, refused to assign her late husband's interest in a patent of this device to his former employer. Provision in the employment contract of this inventor was that he was hired "to continue experimental research and development work."

At the same time this employment contract had been made, the inventor by another agreement assigned to his employer "his entire right, title and interest in and to certain new and useful improvements in rocket construction," which he had invented and for which he had applied for patents.

Granting the demands of the inventor's former employer, the New York court said: "It is indeed true that an employee, who, during his hours of employment, working with his master's materials and appliances, conceives and perfects an invention for which he obtains a patent, he must accord his master a non-exclusive right to practice the invention."

Then in distinguishing the law in its application to circumstances of that sort from the features of the present incident, the court added: "The hand-held rocket was not a conception of this inventor independent of his duties with his employer.

"Indeed, the idea of such a rocket was conceived by the president of the employer. The project of improving the existing rocket and eliminating the separate, expensive and cumbersome pistol-like firing mechanism was involved in and suggested by the problem with which this inventor was then dealing and which was assigned by a superior, the employer's president, as a task to be solved by the employee and the research and development laboratory, of which he had charge." Court brief 163 N.Y.S.2d 287, New York, May 10, 1957.

Requirements Contract

BY A CONTRACT made with an electric company, a coal company agreed to sell this electric company and that company to purchase from the coal company all the coal required by it for fuel for the production of electric energy for 20 years.

By Section 3 of the Clayton Act it is provided in part that it is unlawful to sell or contract for sale on the condition that the purchaser shall not use or deal in the goods of a competitor where the effect of such a sale or contract "may be to substantially lessen competition or create a monopoly."

"The electric company claimed that this fuel contract was valid and enforceable. But, the coal company contended that the contract was a violation of this provision of the antitrust laws. In its decision upholding the contention of the coal company, the Federal court said:

"Under the circumstances two essential conditions are shown to invalidate the contract under Section 3 of the Clayton Act regardless of its merits or beneficial effects otherwise. First, the contract within the sense and meaning of Section 3, is one requiring the buyer not to use or deal in the goods of a competitor of the seller and second, the effect of the contract is to substantially lessen competition." Court brief C.C.H., 1958 Trade Cases 74,643, U.S. District Ct., November 18, 1958.

Copyright Limitation

NEGOTIATING for the sale of an idea represented by a neon sign displaying alternately both the time and temperature on a single bank of lights, the owner registered the design in the United States Copyright Office.

Later, the other party to these negotiations appropriated the idea of this light panel to his own use and the owner of the design sued for damages for the infringement of copyright and for pirating his idea.

In refusing relief, the Federal District Court pointed out that under the copyright law the invention or design is not protected from use by others but only its method of expression. "No rights are claimed or can be established by registration. The work of art is registered without search and the registration is perfunctory."

Then of the disclosure of this information, the court added: "The idea of displaying time and temperature on the same panel was then made public. Knowledge cannot be placed in the public domain and still be retained as a secret." Court brief 167 F.S. 20, Illinois, July 29, 1958.

Employee Competition

CHARGING A violation of confidence in the disclosure of trade secrets to a competitor, suit was brought by a manufacturer against eight former employees and their new employer. Demand in the action was for a million dollars in actual and another million dollars in punitive damages.

In absolving these eight employees and their employer of these charges, the United States District Court in Illinois said in its decision: "The employer must show that it disclosed to its employees matters which were peculiar to the process and machine which he was developing and not common property and that the employees used this in building their machine, and not merely devices and processes which were open to the public.

"This is but carrying into effect the principle declared many years ago by the Supreme Court of the United States that to constitute a trade secret there must be a discovery. And there is no discovery when one skilled in the art develops a process for effecting certain desired results.

"In the case of an employee the attitude of the courts is that expressed by a New York court that the law has no power to compel a man who changes employers, to wipe clean the slate of his memory." Court brief 166 F.S. 250, Illinois, September 8, 1958.

Sanctity of Trade Secrets

UNDER AN AGREEMENT made by a manufacturing chemical company in California, a license was granted an Illinois corporation to manufacture and sell 20 specified compounds. The formulas for the production of these compounds had been developed by the California corporation as had the preparation of the ingredients and were carried on the records of the manufacturer in code and held as trade secrets.

Six of the employees of the licensee had been entrusted with knowledge of these trade secrets. The employment contract provided, "In consideration of your agreement to employ or continue to employ me I agree as follows: 'That I will not directly or indirectly disclose or use to your detriment, either during or after the period of my employment, any information or data of yourself, whether or not developed by me.' "

At the conclusion of the action brought by the owner of the formulas against these employees for an injunction against further use or disclosure of the confidential information they possessed, the court said, "The form-

COURT DECISIONS

ulas were unique and not known to the trade or public and were legal trade secrets and the property of the company.

"The customer lists were trade secrets. The written agreements with the six employees who signed said contracts were valid covenants to hold in confidence and secrecy the information and knowledge which they had learned while employed by this company.

"They were bound to maintain the secrecy and confidence of the employer regarding its trade secrets as a matter of law, arising out of the confidential relationship existing between them and their employer. These employees and each of them have been quilty of inequitable conduct in their wrongful appropriation of the confidential information and trade scerets and the company is entitled to a permanent injunction against future acts based upon such conduct." Court brief 117 U.S.P.Q.251, Illinois.

Consignment and Discrimination

AN OHIO MANUFACTURER brought suit against a wholesaler for damages suffered through a violation of the Robinson-Patman antitrust statute by delivering merchandise to retail dealers who had been customers of this manufacturer on a consignment rather than debtor and creditor basis.

Of the contention of the wholesaler that these acts constituted no discrimination or violation of that law, the Federal appellate court said in its decision:

"We are of the opinion that placing former retail customers of the manufacturer on a consignment basis in order to induce such customers to transfer their business to the wholesaler constitutes, in substance, price discrimination.

"Other types of discrimination are made unlawful. The statute makes it unlawful to pay or grant a commission except for services rendered in connection with the sale of goods, wares or merchandise; to pay anything of value in consideration for any services or facilities furnished by a customer in connection with the handling or offering for sale of any products sold to him unless such consideration is available on proportionally equal terms to all other customers competing in the distribution of such products; to discriminate in favor of one purchaser against another purchaser of a commodity bought for resale by furnishing any services or facilities connected with the handling of such commodity so purchased, not accorded to all purchasers on proportionally equal terms." Court brief C.C.H., 1959 Trade Cases 69,295.

Negligent Car Loading

EMPTY drums, three feet in height and two in diameter, each weighing approximately 125 lb, and used as chemical containers, had been carelessly loaded into a car by the shipper. When the car door was opened the first and second tiers of these drums were standing upright but had been so loosely packed that the third or top row were lying horizontally and in disorder.

For the employee, assigned to the unloading of the car, the only method that appeared to him to be safe was to get inside the car and on top of these drums, find a safe place to stand and roll out the top layer.

After a half dozen of these drums had been unloaded in this manner, the workman was called off the job. Getting out of the car backwards by hanging onto the frame of the car door, he swung himself out and reached with his feet for the top rung of the ladder he had used in gaining entrance to the car.

One of the drums toppled toward him. In shoving it back he lost his grip on the door frame and fell.

Defense interposed to the suit brought by the employee against the employer was that he had been contributorally negligent in his method of doing the work and extricating himself from the car, and hence, not entitled to a recovery.

In reversing a judgment that had sustained this defense and ordering a new trial, the California appellate court said, "We have a picture of a man who was faced with a situation different from that which normally confronted him when unloading a car.

"He adopted a method for unloading this car which, according to him, seemed suitable for getting the drums out with the minimum of risk. The mere fact that the accident did occur does not demonstrate as a matter of law that he acted negligently in the selection and use of that method." Court brief 334 Pac. 2d 299, California, January 27, 1959.

Voluntary Services

HEATING AND air conditioning units were featured in the remodeling of houses in the District of Columbia. A schematic layout for the necessary ducts and registers was made by an engineer of the seller for the owner, without charge.

After the installation had been completed, the owner, contending that these specifications and plans were insufficient and improperly prepared, sued for damages. In his defense to the action, the engineer who had prepared the layout asserted that since the work had been done gratuitously and solely as an accommodation, there was no liability.

In its refusal to sustain this defense, the court said of the law governing the responsibility of those furnishing gratuitous services: "One who undertakes to perform a service for another has a duty of exercising care and is liable for his failure to do so even though his undertaking is gratuitous. It is ancient learning that one who assumes to act even though gratuitously, may thereby become subject to the duty of acting carefully, if he acts at all." Count brief 143 Atl.2d 99, District of Columbia, June 20, 1958.

Advertising Contributions

IN A SUIT before the United States District Court in South Carolina, motor car dealers charged that they had been compelled by an automobile manufacturer to contribute to an advertising fund the sum of $25 for each car of this manfacturer which they sold.

Further, that the money so collected was used in sponsoring a television show that at that time was not received in their sales area.

This, these motor dealers contended, violated Section 3 of the Clayton Act which forbids anyone engaged in interstate commerce from making a sale or contract for sale with the agreement that the purchaser should not deal in the goods of a competitor where the effect may be a substantial lessening of competition.

This advertising method, it was charged "tied" the sale of this manufacturer's automobile products to the sale of advertising. Also, that the compulsion to contribute to this fund prevented this and other dealers "from resorting to competitive media of advertising and that thus there was an unreasonable restraint of interstate trade in advertising."

In its judgment, absolving the motor car manufacturer of a violation of this statute, the Federal court said: "It is enough here that substantial advantages inured to the dealers through the single advertising program.

"It is not shown that the manufacturer had any interest in the advertising agency except to obtain effective advertising service from it. The manufacturer was not using its economic position to invade and dominate the advertising business." Court brief 161 F.S. 738, South Carolina, Apr., 1958.

Keeps his bearings with NEBULA® EP

Consider your maintenance man—a very important figure in your cost-cutting plans. He likes to give bearings special attention because they're the focus of strain and wear. An outstanding multi-purpose lubricant such as Nebula EP helps him keep bearings in top condition—helps you keep repair bills down.

Because of its exceptional range of usefulness, Nebula EP is suitable for virtually all grease applications—including bearings subject to extreme pressure, moisture and temperature conditions. Nebula EP is insoluble when immersed in boiling water, resists break-down when exposed to running water or steam! It retains optimum consistency over a wide range of bearing temperatures, resists thinning even at temperatures up to 500°F.

With Nebula EP1, your maintenance man can work faster, too. Nebula EP flows easily in dispensing equipment, and this one grade eliminates the need for several grades of ordinary greases. It is also available in labor-saving cartridge form. For more information on how this outstanding lubricant can bring savings to your operation, call your nearest Esso office, or write: Industrial Lubricants Division, Esso Standard Oil Company, 15 West 51st Street, New York 19, New York.

Esso

In Industry after Industry..."ESSO RESEARCH works wonders with oil"

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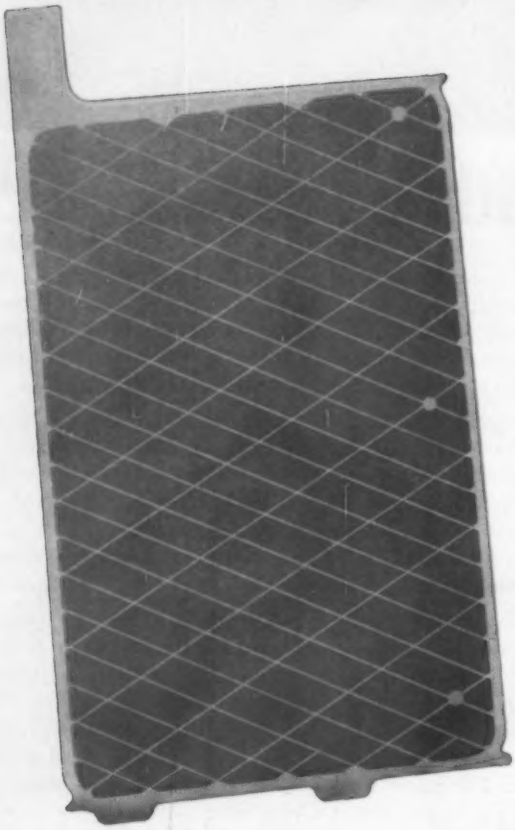
NEW GOULD *SILCONIC* PLATE Increases Battery Life 25%-FREE!



A vital contribution to motive power batteries, Gould's NEW Silconic Plate prevents grid corrosion, the most common cause of battery failure.

Sound, tested and proved, the principle is simply this: Gould introduces silver and cobalt into active materials of the positive plates. The silver and cobalt migrate to—and collect on—positive grid members, forming an insoluble oxide surface impervious to acid and oxygen attack. The longer the battery operates, the deeper the silver-cobalt penetrates into the grid metal, thus greatly prolonging life. In applications where batteries are idle for periods of time, Gould's Silconic Plate prevents migration of materials to the negative plate, effectively reducing self-discharge within the cell.

Further overall strength is achieved when arsenic is added to the antimonial alloy of the plate, resulting in an extremely dense, homogeneous grid free of flaws. This new physical and chemical strength—together with Gould's compact battery design—add up to the best motive power battery you can buy. Write today or call your local Gould representative. He's listed under "Batteries Industrial" in the yellow pages. Gould-National Batteries, Inc., Trenton 7, N. J.

More Power to you from **gould**

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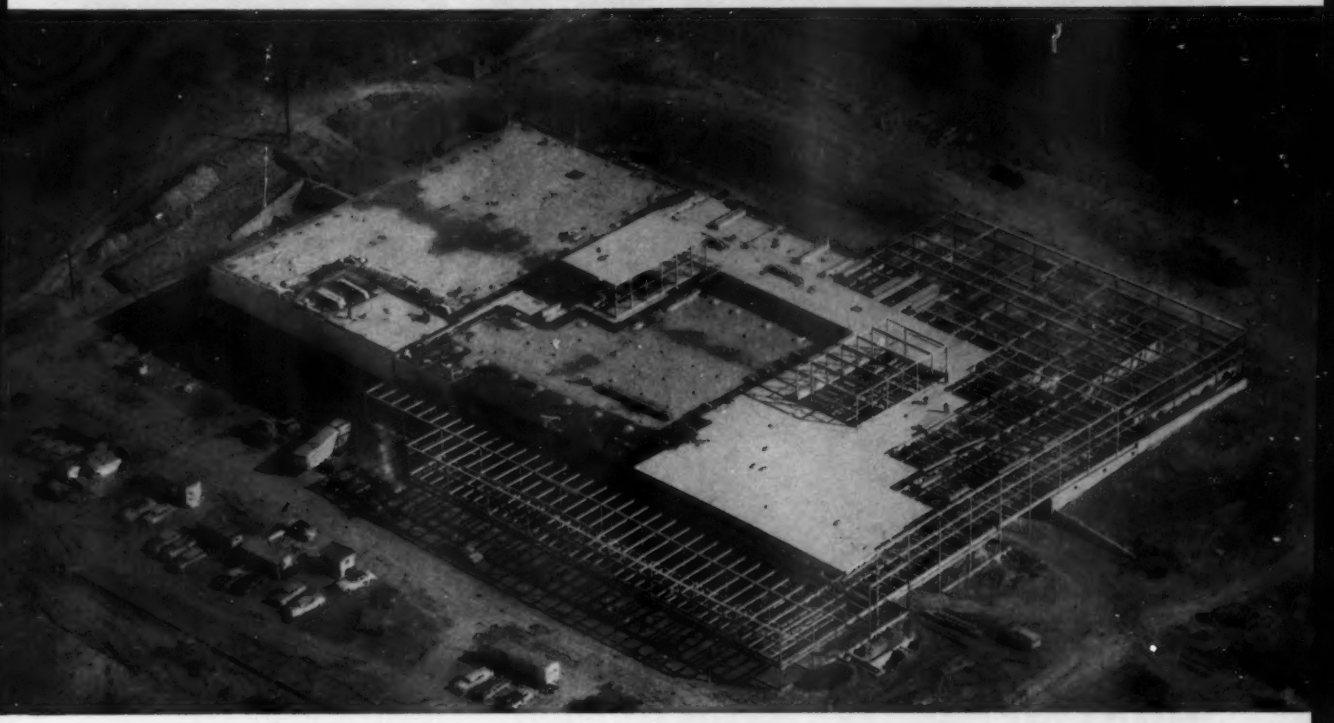

Steelwork for Sylvania's new Altoona plant by American Bridge

THE large and handsome building shown above is the new receiving tube plant of Sylvania Electric Products, at Altoona, Pennsylvania.

This 310′ x 400′ two-story steel-frame building provides 190,000 sq. ft. of manufacturing space—enough to replace two smaller tube plants, with room to spare.

Here again is another progressive industrial firm which plans its manufacturing facilities with an eye to the future. For, whenever it becomes necessary to further expand its Altoona operations, the steel-frame structure can be readily extended up or out to accommodate any amount of additional space.

And it can be done in any weather . . . in less time . . . with less inconvenience . . . and usually at considerably less cost with steel than with any other material.

American Bridge fabricated and erected 1,082 tons of structural steel for this job. If you would like to know more about the advantages of having American Bridge handle the steelwork for your next building, just contact any of the offices listed below.

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Mounted approximately 25 feet above floor in fixtures spaced about 15 feet on centers, 348 Sylvania Ruggedized Silver-White Mercury Lamps in Cessna's plant provide an initial average of 70-85 foot-candles of light

Now . . . Cessna gets **MORE EFFECTIVE LIGHT** from its high-bay installations!

Sylvania Ruggedized Mercury Lamps deliver more than 2½ times the light of incandescents of the same wattage.

At the Cessna Aircraft Company's Military Division T-37 jet flight test hangar in Wichita, Kansas, the order went out for light . . . lots of light . . . at the working level. The light, however, would have to come from high-bay mountings.

The answer was Sylvania Ruggedized Silver-White Mercury Lamps!

Sylvania Mercury Lamps, because they produce more than 2½ times the light of incandescents of the same wattage.

The Ruggedized line, because they are ruggedly constructed to withstand shock and vibration in service, as well as resist moisture, condensation, thermal shock.

The Silver-White series because they deliver up to 22% more lumens than other types of color-improved mercury lamps.

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And only Sylvania Mercury Lamps have the exclusive life-recording bases which permit you to keep a convenient permanent check on lamp performance.

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ROTATING & RECIPROCATING MACHINERY

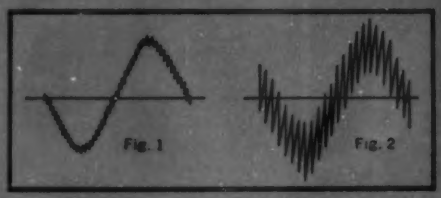
breakdown? downtime!

UNFORESEEN DELAY – MONEY LOST

New Vibraswitch 66... the Robertshaw Early Warning System that guards against extensive machinery damage

Despite the best preventive maintenance program, unforeseen machinery damage does occur. Excessive vibration is frequently the first indication of impending damage in rotating and reciprocating equipment. When harmful vibration is detected at an early stage, damage can be sharply reduced, limiting both downtime and repair costs. Latest of the industry-accepted Vibraswitch Series, the new Vibraswitch 66 provides a low-cost method of directly sensing destructive vibratory forces.

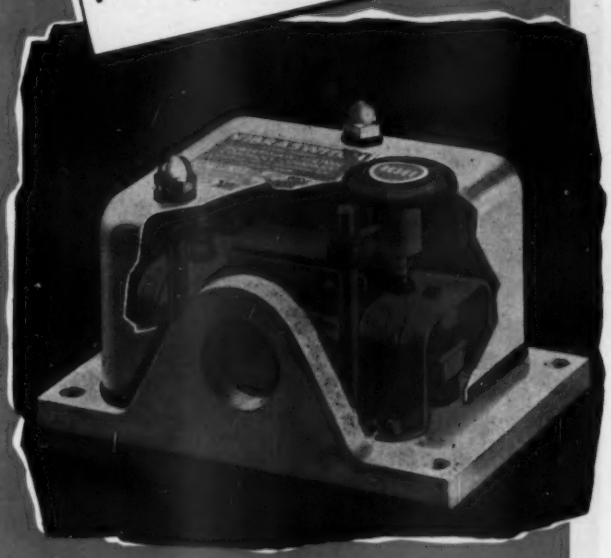
OPERATION—Machinery damage caused by excessive vibration begins with unbalance of various magnitudes. When defining the destructive characteristics of excessive vibration, it is necessary to consider both amplitude and its secondary derivative, acceleration. Figure one, normal operation, represents fundamental rotational frequency superimposed with higher frequency, low amplitude noise or chatter occurring in such vital parts as bearings and gears.



Too frequently, however, these vital parts fail, causing an increase in amplitude occurring primarily in the secondary, higher frequency vibration component, (see Figure two). Extensive damage can be prevented by early detection of these destructive forces. Robertshaw Vibraswitches detect both fundamental unbalance and harmful secondary vibration, providing twofold protection shared by no other known device.

FEATURES—Standard: maintenance-free—no moving parts (except when actuation occurs)—manual reset—wide range sensitivity adjustment—provision for shutdown or alarm. Optional: remote reset—starting or running time delays—multipoint operation.

Now less than $100 buys automatic malfunction detection



APPLICATIONS: Pumps, compressors, gas and steam turbines, centrifuges, motors and generators, diesel and gas engines, fans and blowers, gear boxes, and other rotating and reciprocating machinery.

MODELS: Vibraswitch 66—for unsheltered non-hazardous locations requiring water tight equipment. Vibraswitch 65—for hazardous locations requiring explosion-proof equipment.

Write for complete technical information.
Field offices and representatives in principal cities.

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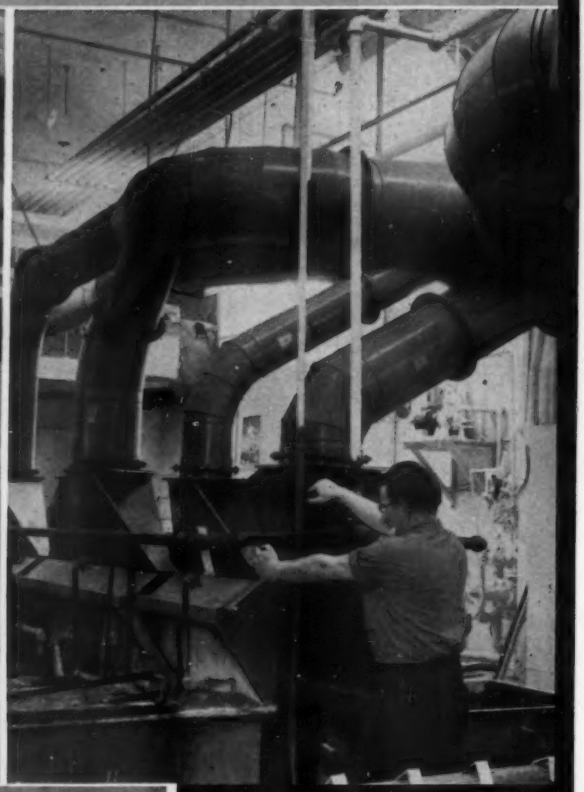
Industrial Plastic Fabricators, Inc. reports . . .

Complete Boltaron 6200 installation . . . ducts, tanks, hoods, blowers



Boltaron 6200

handles chemical & industrial fumes safely and economically

Boltaron 6200 IS BEST BECAUSE:

- Protects against most corrosive fumes and liquids in any combination.
- Resists build-up of residual materials from corrosive fumes and liquids.
- Solid Boltaron has no coatings to peel or chip—does not require recoating or repainting.
- Chemically inert.
- Non-toxic, imparts no taste or odor.
- Can be welded, bolted, threaded, milled, ground, buffed and polished.
- Non-sparking—will not support combustion—handles fumes and liquids.
- High dielectric strength.
- Extremely lightweight—non-porous—and smooth surface.
- Tensile strength is 8000 psi.
- Can be joined by heat welding, solvent cementing, and threading.

IPF systems fabricated from Boltaron 6200 are being used the nation over by many progressive manufacturers to solve numerous industrial problems, especially where corrosive fumes and liquids have been extremely costly to handle. Performance proves Boltaron 6200 systems help decrease operating costs—increase operating efficiency.

For further information on performance-proven Boltaron 6200 systems, call or write:

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You can control hot water temperatures automatically–economically

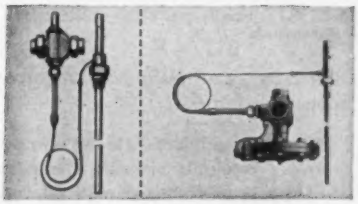
By John W. Ritter, Test Engineer
SARCO Company, Inc.

A dependable supply of hot water at exactly the right temperature for employee comfort is just as important a task for the plant engineer as providing properly heated water for process requirements. Fortunately, accurate, reliable regulation of water temperature is easy to achieve *economically* through the use of properly selected temperature controls.

It's impossible to maintain constant supervision of the delivered temperature of hot water with manual controls. Accommodating fluctuating loads that vary all the way from zero to peak requires automatic temperature regulation, controls that stay on the job all day long.

What to look for:

Automatic regulators are not difficult to select if you bear in mind the degree of control you require. You need reliability within a fairly constant predetermined temperature range – anything more than the *simplest mechanism to do this job is a waste of money.*

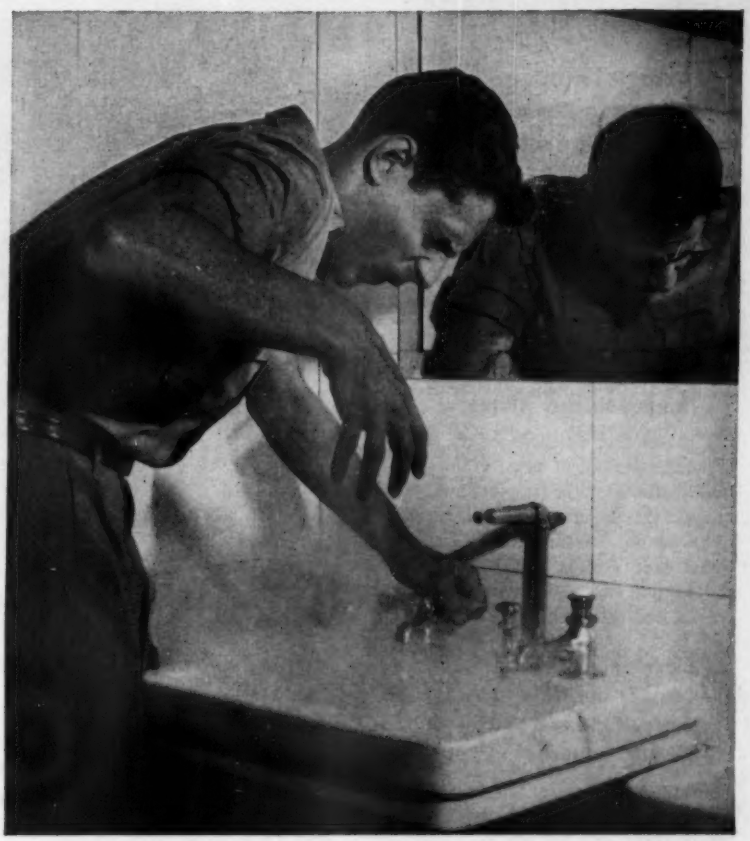


Sarco Type 50-21 Self-Powered Temperature Regulator

Sarco Type 24-30 Self-Powered Pilot Operated Temperature Regulator

First cost is important, naturally; but it is also well to examine very carefully the cost of installing or maintaining a temperature regulator. A pipe fitter should be able to do the job. When all these criteria are applied to regulator selection, the logical choice narrows to a self-operated type like the Sarco 24-30 pilot-operated model or the fully-modulating 50-21. Both of these regulators operate by powerful self-contained hydraulic systems that provide smooth operation with even increments over their full temperature range.

Both Sarco self-operated types give you automatic temperature control without high cost. The result: hot water constantly supplied at the required temperature regardless of fluctuations in supply or demand.



End erratic hot water temperature... with SARCO Self-Powered Controllers

You'll find Sarco Self-Powered Temperature Controllers regulating water temperature in scores of industries. And because these Sarco Temperature Regulators require no electricity, compressed air, or any external power supply, because they're the simplest automatic controls made, they can be kept in first-class working order by the regular maintenance staff – without special training. There are no glands or stuffing boxes, nothing to get out of order. And Sarco Regulators are inexpensive to buy, easy to install.

Write today for Bulletin 620, on Sarco self-powered temperature regulators. 6929-B

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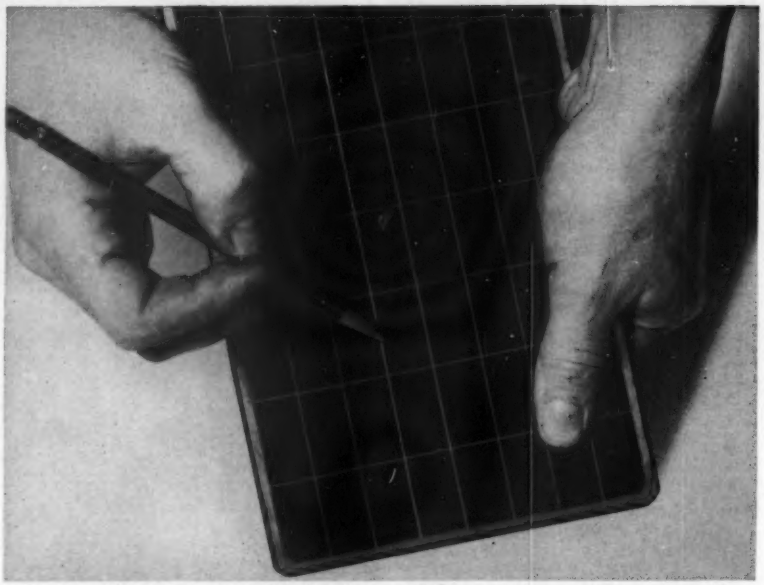
New C&D AccuPak*

plates improve battery performance; increase life!

Automatic nuclear control holds plate uniformity to finest possible tolerance; provides 100% inspection!



Precise weights and amounts of lead oxides must fill the especially cast battery plate grids to assure the maximum capacity and electrical characteristics.

Electric truck battery users will find three major advantages in C & D *Slyver-Clad*® batteries containing the exclusive, new *AccuPak** plates:

1. Extra long life—because of longer, thicker plates.

The true final determinant of battery life is the amount of metal in the grids. C&D batteries outlast any other battery because they have the heaviest, thickest plates made. The maximum cross-sectional area grid is cast by a special process that eliminates flaws, shrinkage, cracks, and dross inclusions.

2. Extremely uniform *AccuPak* plates; no low cells; high capacity to end of life—due to *AccuRay* control of pasting.

C&D uses *AccuRay*** to automatically control the amount of active materials going into the grid structures of *both positive and negative plates!* C&D is the only industrial battery manufacturer using *AccuRay* control.

The use of *AccuRay* to control the pasting operation means that plates have maximum uniformity of weight, density, and thickness of active material. *AccuRay* controls uniformity to within ±½% and automatically subjects every plate to a 100% inspection.

Exclusive *AccuRay* control—another C & D first—once again sets the pace for the battery industry. *AccuRay* automatically controls weights of all battery plates to a point of uniformity heretofore impractical.

3. No life-shortening nor capacity drop-off due to sediment build-up—because of *Slyver-Clad*® insulation and retention.

The longer, heavier, more uniform plates are then wrapped with the time-proven C&D *Slyver-Clad* five-fold insulation. This consists of a layer of extremely fine parallel glass filaments or sliver, a vertical glass wrapping, a horizontal glass wrapping, a perforated plastic retainer, and finally a microporous rubber separator.

The combination of these five layers of retentive materials virtually eliminates shedding, or loss of active material, with its accompanying life-shortening build-up of sediment in the bottom of the container. Thus, a huge bottom sediment space is not needed. C&D fills this space in standard containers with the heaviest, thickest plates available in any industrial battery.

For full information on C&D *Slyver-Clad* batteries featuring *AccuPak*, write for Bulletin IT-530.

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Manufacturers of *Slyver-Clad*® Industrial Batteries • PLASTICELL* and PLANICAL® Batteries for Communications, Control and Auxiliary Power • Producers of *Autolay*® Silicon Chargers

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WHAT'S JUST AHEAD IN THIS ISSUE?

- GROUNDING of industrial electrical circuits is a practice that everyone knows "should be followed." To help explain the value of the practice, the article starting on page 88 presents the reasons for grounding, in a series of typical industrial circuits.

- "INSTANT STEEL," our editorial term for steel produced directly from ore by means of the Madrigal process, promises worthwhile benefits to all industry—and, perhaps, directly to the plant engineer. To see the first step-by-step photos (we understand) of this process, read the article starting on page 92.

- A NEW ARTICLE series, "Construction Cost Estimating," starts in this issue. In the series, the author gives you the benefit of his tedious hours of calculating . . . by listing unit costs and factors that will give you construction costs quicker than you thought possible. Turn to page 96 for the first of these helpful articles.

- WEIGHING material while in motion can save a lot of unnecessary handling. There are numerous ways in which this can be done. Just a few of them are discussed in the article appearing on page 102, to give you some idea where they may be of help to you in your plant handling problems.

- IN SPITE of the long association of oxygen and acetylene in the flame cutting of metals, the two gases aren't an un-splittable pair. In their plant, our authors have successfully introduced flame cutting with natural gas as the fuel. For their analysis of costs and results, turn to page 105; you may get some ideas.

- ODORS CAN hamper plant operations and cause personnel discomfort. This was the very problem that faced a furniture manufacturer. To eliminate these odors and provide fresh air, the company installed an activated charcoal air purification system. For further details, read the article on page 112.

- IF YOU have any doubts about the need for a good scrap handling system, you can figure what the lack of one is costing by looking at "Scrap Handling Programs—How To Plan Them for Profits." Then you can judge, from the information given, how you can best handle scrap in your plant. The article begins on page 114.

INCINERATOR TEAMS UP WITH WASTE-HEAT BOILER TO SAVE MONEY

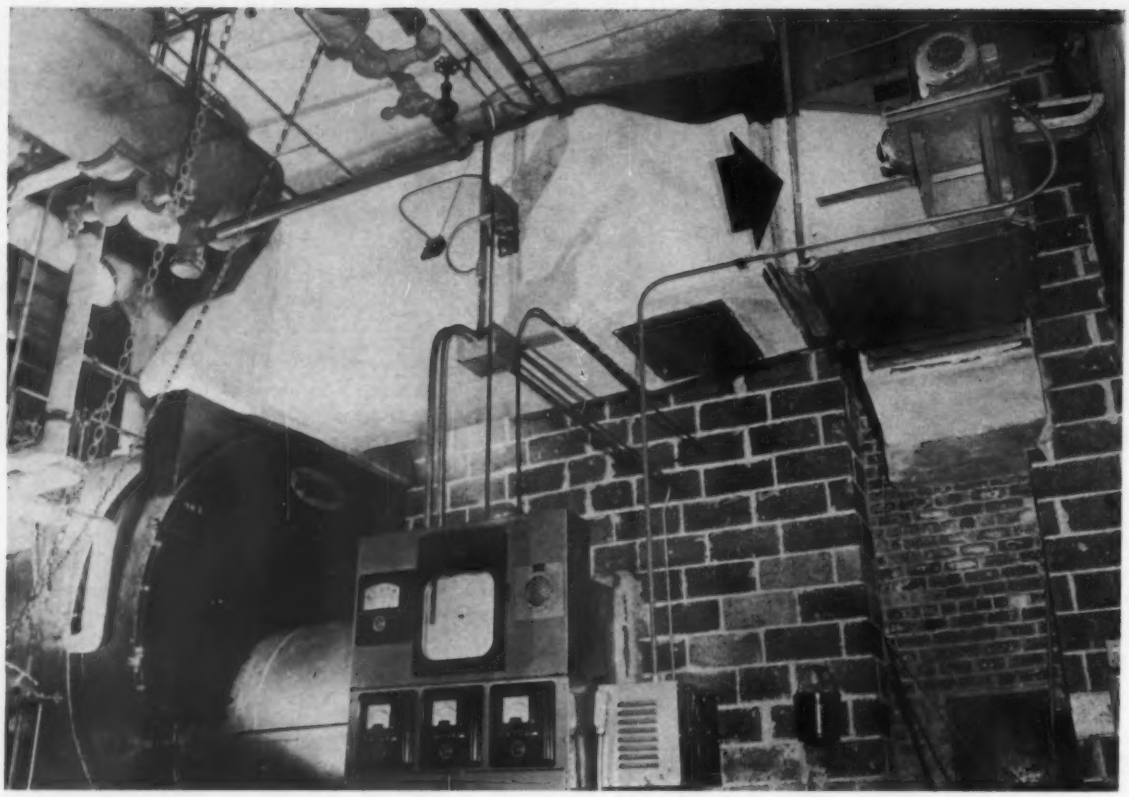


Fig. 1. Incinerator is located behind block wall. Draft inducer, arrow, draws hot gases through waste-heat boiler.

BURNING WASTE paper for steam generation is saving Alexander's Department Store in White Plains, N. Y., $2000 per year in fuel costs alone. The heat from the burning waste paper supplies up to 30 per cent of the total steam required for peak operation. During spring and autumn when air-conditioning demands are low, the waste-heat boiler furnishes all the steam needed to air-condition the store. The large four-story building has a 700 ton steam-operated unit.

Waste paper, boxes, excelsior, wooden crates and a small amount of cafeteria waste are collected by chute in a large bin near the incinerator from the selling floors. Although the waste available varies, it is generally sufficient for normal operation. In an emergency, baled paper from Alexander's other stores has been burned.

The waste-heat utilization system (Fig. 1) consists of the incinerator, with capacity for burning up to 800 lb of refuse per hr, the waste-heat fire tube boiler rated at 4000 lb of steam per hr, and an ingenious system of ducts, dampers, and controls.

An essential part of the system is an L. J. Wing mechanical draft inducer. See Figs. 1 and 2. When the system is operating at full load, the stack does not supply enough draft to draw the hot gases from the incinerator through the boiler. The consulting mechanical engineers were limited in the stack height by architectural considerations. Therefore, they specified a

mechanical inducer so that the chimney or stack height would conform to the building design and provide combustion draft.

At start-up the draft inducer is turned on, and the incinerator is loaded. A gas burner helps to start burning as well as reduce fly-ash. The gases from the incinerator are drawn through the boiler, and then exhausted through the stack to the atmosphere. The draft inducer builds up draft of 0.3 to 0.4 in. w.g. It is driven by a 1½-hp variable speed motor, manually controlled.

The duct work or flues connect the incinerator directly to the stack as well as to the boiler. Passage of the hot gases to either the boiler flue or the stack flue is controlled by guillotine-type dampers which are connected by a common cable to a small control motor. When the desired steam pressure is reached, the control motor closes the damper to the boiler, simultaneously opens the damper to the chimney and the draft inducer is stopped. See Fig. 3. A second guillotine-type damper in the flue to the chimney regulates the amount of natural draft. This damper is also operated by a small control motor receiving signals from the draft gages. It modulates or throttles the flow of gas to the chimney whereas the other two dampers are fully closed or fully open.

Flues and chimney are equipped with Ringelmann haze or smoke meters which automatically sound a warning when the amount of solid particles in the flue gas reaches a value set by local ordinance.

A separate oil-fired boiler rated at 13,100 lb steam per hr supplies the balance of the steam required. The waste-heat boiler and the standard boiler are connected to a common steam header. The first 20-30 per cent of the total steam demand is handled by the waste-heat boiler. When the demand rises above the capacity of the waste-heat boiler, the standard boiler is started automatically.

Safety regulations are strictly observed. Only one of the two incinerator doors is open at one time. The door to the waste bin is closed when an incinerator door is open. A quantity of refuse is pulled from the bin and its door is closed before furnace door is opened. **End**

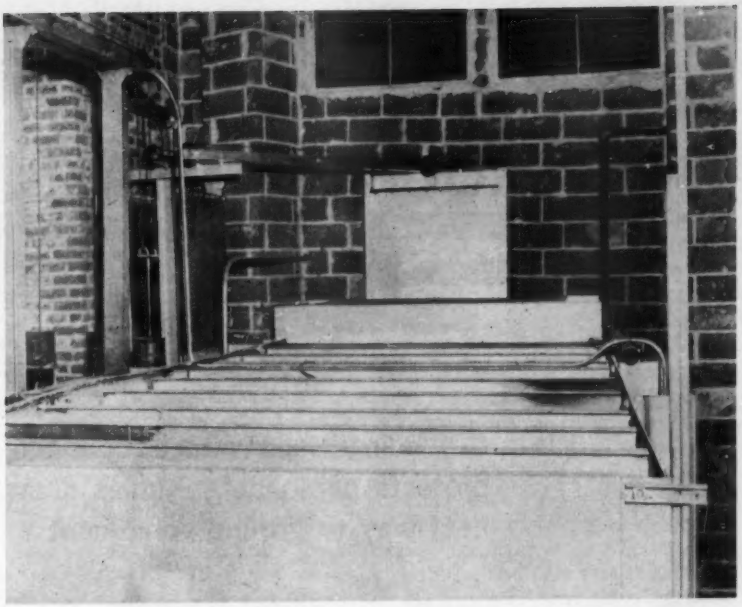


Fig. 2. With aid of dampers gas flow is routed to boiler or chimney at left.

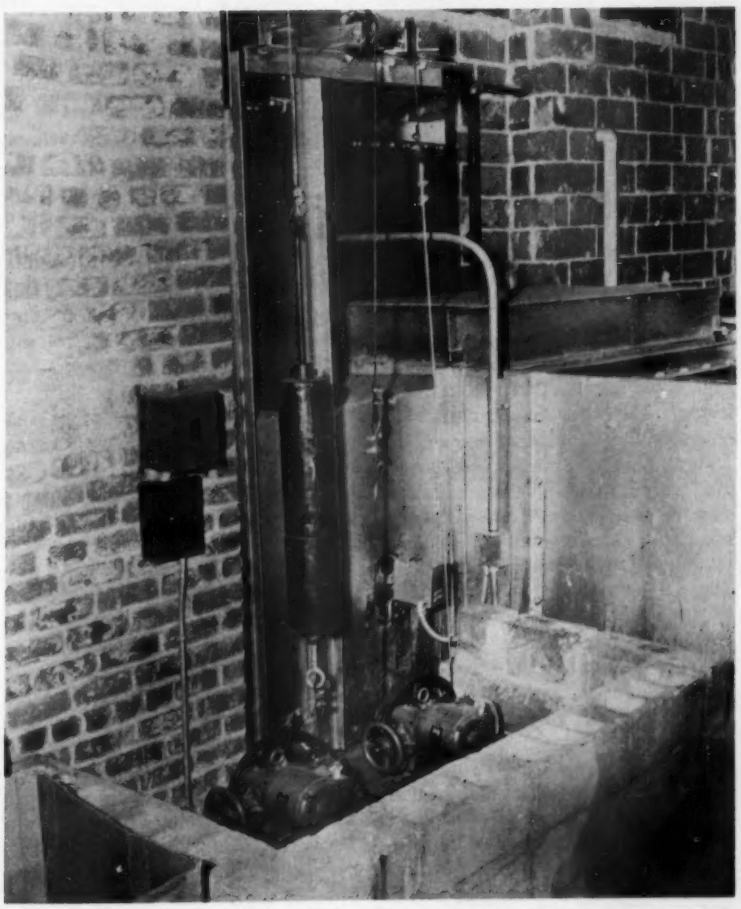
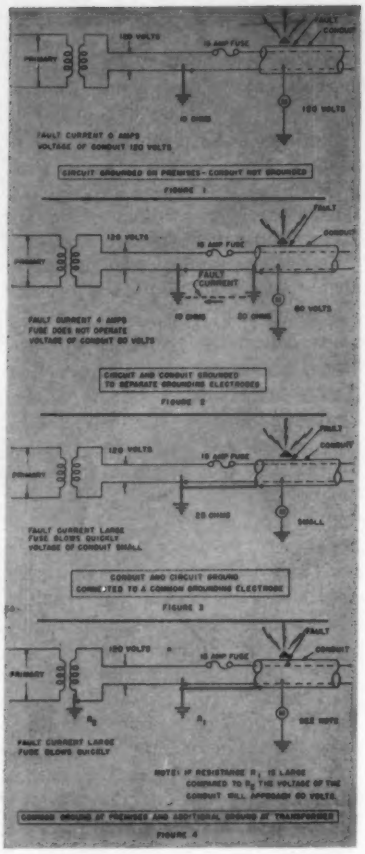


Fig. 3. Right motor opens and closes chimney and boiler dampers simultaneously; motor at left modulates another chimney damper according to the draft.

WHY GROUNDING PAYS!

Grounding keeps voltages confined, protects personnel. Studies show best way to ground equipment

By W. J. NEISWENDER, Plant Engineer, Plant Design and Construction Division, Western Electric Co., New York



CIRCUITS ARE GROUNDED to avoid unnecessary and dangerous differences of potential between two conducting surfaces. Another reason is to limit the voltage on the circuit which might otherwise occur through exposure to other voltages higher than for which the circuit is designed.

To more clearly illustrate the first point, let us look at a few low voltage secondary circuits typical of the conditions you might expect to find in the average industrial plant. In Fig. 1 we see a distribution transformer, 120-v service leads, a 10-ohm ground at the service and a 15-amp branch circuit serving a load through an ungrounded conduit. Assume a short circuit due to insulation failure occurs, energizing the ungrounded conduit. The conduit is then at the same potential as the ungrounded secondary circuit conductor.

With no ground on the conduit there would be no fault current, and the conduit could remain at 120 volts-to-ground indefinitely. Anyone touching the conduit and ground would experience a shock.

What happens when we add a separate 20-ohm ground to the conduit, Fig. 2? When a fault develops between the ungrounded 120-v conductor and the conduit, there is a fault circuit to the conduit ground through the earth to the neutral ground back to the unfused conductor. A 10-ohm and a 20-ohm ground in series gives 30 ohms, so at 120 v, the fault current will be four amperes.

Four amperes is not enough to blow the 15-amp branch circuit fuse, so that a voltage potential can persist on the conduit to ground indefinitely as a four ampere load on the branch circuit. A four ampere current through a 20-ohm ground places 80 v on the conduit.

A slightly different condition is shown in Fig. 3. The conduit and grounded circuit conductor are connected to a common grounding electrode. Shown for illustrative purposes is a 25-ohm ground on the neutral at the service as a common ground for the conductor in the conduit and for the conduit itself.

If a fault develops between the ungrounded conductor in the conduit and that conduit, little of the fault current will go into the 25-ohm ground because the fault is a direct short circuit on the system. The fault current is large because of the ungrounded conductor to neutral short circuit, so that only a small momentary voltage appears on the conduit for the short time it takes the 15-amp fuse to blow.

In Fig. 4 we see the factors that control the voltage to ground when a short to ground occurs on the secondary distribution line. The sketch shows a ground with resistance, R2, at the transformer and a ground, R1, at the service equipment which also grounds the raceways or conduit. When a fault occurs between the ungrounded 120-v conductor and the conduit, a short circuit results which blows the 15-amp fuse promptly.

If the resistance, R1, is large compared to R2, the voltage of the conduit to another ground will approach 60 v as a maximum when the voltage drop in the transformer is negligible. Assume that R1 is infinity or very high in resistance. Then, with a short circuit in the conduit, there will be a 60-v drop on one side of the line and a 60-v drop on the other side. With 120 v at the transformer, the maximum voltage to ground of the conduit will be 60 v.

When the resistance of R1 or R2 are both low so that the resistance of the neutral is not important, most of the fault current will return

through the ground. This would occur if both of the earth grounds have low impedance such as water pipe grounds; then the voltage to ground would be very low as most of the line drop would occur on the underground conductor.

All of the preceding examples involved a branch circuit ground fault. Now let us see what occurs when a fault develops between the primary and secondary sides of a transformer, Fig. 5. Here we have a substation which supplies 2400 v to the building transformers. The transformer in the substation is grounded on its secondary side.

Let us assume a fault occurs, as shown, between the primary and secondary sides of the building transformer. Since there is no secondary ground, there is no fault current and the secondary system rises to the voltage to ground of the primary system, or 2400 v.

What happens when we add a secondary ground to the building transformer, Fig. 6, and also add a ground connection on the line side of the service entrance switch? The two 10-ohm grounds in parallel become, by Ohm's Law, a five-ohm ground on the neutral of the system. Adding the impedance of the distributing circuit and the transformer, we have: three ohms in the line, five ohms in the transformer, two ohms on the grounded side of the 2400-v feeder and five ohms in the neutral ground of the 120-v system, giving a total of 15-ohms for a fault current of 2400 divided by 15 or 160 amp.

One hundred sixty amperes and five ohms for the two 10-ohm grounds in parallel gives a voltage of 800 v. The 160-amp fault current will blow the 50-amp fuse in the feeder promptly. Instead of 2400 v the voltage is down to 800 v, and exists only for the time it takes the 50-amp fuse to blow.

Effects of Impedance

In all of the preceding figures it has been assumed, for simplicity, that the fault itself had zero impedance. However, although many faults will have almost zero impedance, there will be many with an appreciable value of impedance. What changes would occur if we assumed that the fault had an impedance?

Let us analyze the results when the fault impedance is assumed to be 30 ohms and also when it is assumed to be 60 ohms, Fig. 7. Adding the impedances as before we have 15 ohms in the distributing circuit and the transformer plus the 30 ohms for the fault's impedance, giving a total of 45 ohms. In this case 2400 divided by 45 ohms gives us 53.33 amp. This current is still large enough to cause the fuse to blow and the instantaneous voltage appearing on the meter will be approximately 267 v.

Now if we assume the fault impedance to be 60 ohms the total impedance will be 75 ohms and 2400 v divided by 75 ohms is equal to 32 amps. This current is not large enough to cause the 50-amp fuse to blow and a voltage of 160 v will persist indefinitely.

However, a load current of 18 amp in the 2400-v circuit will bring the current to the point where the 50-amp fuse will blow. This situation clearly illustrates the value of a low impedance path for an equipment ground. The lower the impedance, the lower the value of voltage which can persist from the circuit equipment to any ground point in the vicinity.

Ungrounded low-voltage systems permit primary voltage to appear on the low voltage wiring under fault conditions and thus expose the normally non-energized metal parts of the electrical systems. They are not recommended for use in Western Electric locations and the following discussion will be limited to grounded systems. There are two basic ways to ground low-voltage systems, Fig. 8, and each of these systems has advantages and disadvantages.

One of the main advantages of the grounded wye system is that the lower voltages between the phases and neutral result in less voltage stress to ground and decreased insulation failure in mains and devices. This is particularly true in 575- and 460-v circuits which op-

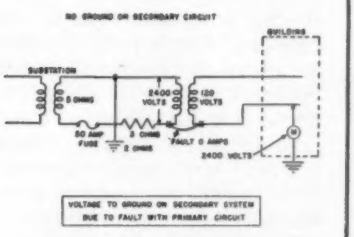


FIGURE 5

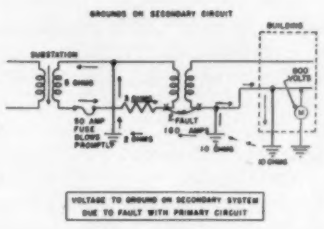


FIGURE 6

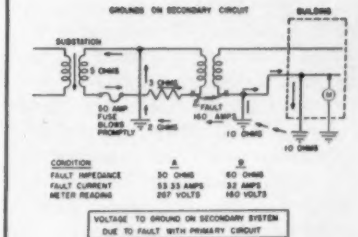


FIGURE 7

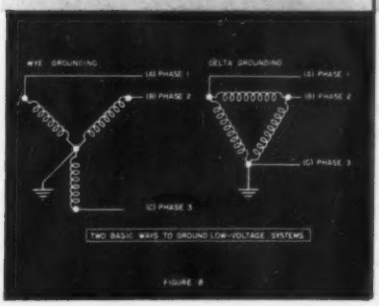


FIGURE 8

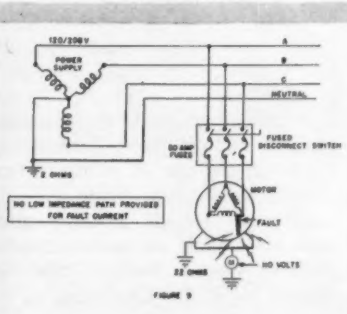


FIGURE 9

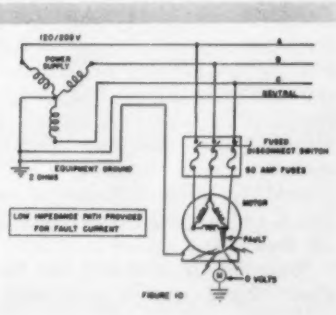
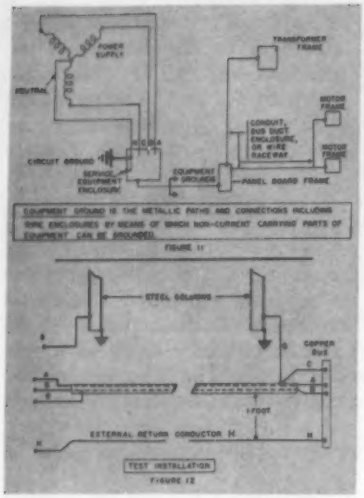


FIGURE 10



erate close to the 600-v rating of the wire.

The chief disadvantage is that a grounded wye system costs more than delta grounding. This is because protective devices in the grounded wye system should be equipped with an overcurrent element in each phase to recognize all ground fault conditions. However, present practice is to provide three overcurrent elements in all the low-voltage air circuit breakers and this tends to help offset the cost difference. Most new industrial installations have used wye-connected, low-voltage transformers suitable for neutral grounding.

Now let us look at the matter of equipment grounding for three phase low-voltage systems. The most important feature necessary for an adequate equipment grounding system is a low impedance path for the fault current to return to the source of power. If this low impedance path is not available, the current may not be sufficiently high to operate the overcurrent devices in the circuit.

Figure 9 shows a wye connected secondary system with a solidly grounded neutral through a two-ohm ground. Assume the secondary voltage is 120/208 v. The load on the branch circuit is protected by 50-amp fuses and the load is grounded to a separate 22-ohm ground. No equipment ground system is run from the transformer to the load.

When the fault occurs, we have a two-ohm ground in series with a 22-ohm ground or a 24-ohm impedance across the line-to-ground voltage of 120 v. This results in a five amp current flow which is not sufficient to blow the 50-amp fuse. However, five amperes times 22 ohms maintains the motor casing potential at 110 v above ground.

In Fig. 10 we have the same circuit but an equipment ground has been run between the transformer and the motor. Let us assume that the equipment ground offers a one-ohm path back to the transformer neutral. When a fault occurs, 120 volts-to-ground will result in a 120-amp current flow and the 50-amp fuse will blow, promptly clearing the fault from the system. Equipment ground impedance should be low enough to pass at least twice the rating of the overcurrent device at phase-to-ground voltage.

Now let us look at the actual apparatus used in a typical plant to furnish the low impedance path for the fault current to return to the power sources. Figure 11 shows a wye-connected, transformer secondary with a solidly grounded neutral. The service equipment enclosure is connected by a wire conductor to the power supply neutral. This wire is the first link between the neutral and the equipment ground for the plant.

Ground Is Through Enclosures

From the service equipment, the equipment ground is continued by way of conduit or bus duct enclosure to a panelboard frame. From the panelboard frame, the equipment ground is continued to all of the panelboard circuits by means of metallic conduit, bus duct enclosures, or wire raceways.

This method is the most commonly used system for equipment grounding today. It is at this point that the question arises, "Does the conduit, bus duct enclosure, or metal raceway constitute an adequate low impedance equipment ground?"

Many tests have been performed and much discussion has taken place on the use of external bare ground conductors being run for equipment grounds in conjunction with a conduit or armored cable enclosed electric feeder. Tests conducted by R. H. Kaufmann of the General Electric Company were made using the procedure shown in Fig. 12.

The test procedure simulated a fault at several values of current and provided the fault current with various return paths. The outgoing current was sent over conductor A. When conductor B was used as a return path, 100 per cent of the fault current returned over conductor B. The same results occurred when the conduit was used as the only return path.

Paralleled Return Paths

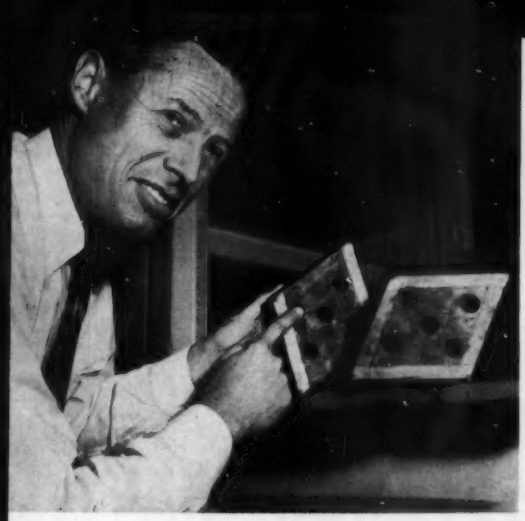
However, when conductor B and the conduit were paralleled as the return path, conductor B carried eighty per cent of the current and the conduit 20 per cent. Next, the conduit was paralleled with conductor H which ran one foot away and parallel to the conduit. When the fault current was returned through this combination, the conduit carried 95 per cent and conductor H 5 per cent of the current.

Then the conduit was paralleled with the building steel as a return path for the fault current. Under this test, the conduit carried 90 per cent and the building steel 10 per cent of the return current.

The conclusions reached were that under short-circuit-to-ground conditions inductive reactance will exert a powerful influence in directing the return current to flow in a path closely paralleling the outgoing power conductor. The enclosing conduit or metallic raceway would constitute such a path. To attempt to relieve the conductor enclosure by installation of an external conductor is quite ineffective. Connections to nearby building structural members are equally ineffective. Only through the installation of an internal grounding conductor can the current carried by the enclosure be reduced.

Results of these tests indicate that if an additional equipment ground is to be added to a bus duct system, it should be within the bus duct enclosure. However, a separate wire cannot be justified usually because the enclosure alone must be assumed to have adequate capacity and low enough impedance, otherwise the enclosure itself is not safe against internal faults.

(Continued on page 176)



Left: No-spring, shop-adjustable rhombic suspension features these rubber rhombuses (parallelograms whose angles are oblique rather than right-angled). Swiss-cheesed rhombuses shown here give soft ride. Solid rubber rhombuses give harder ride, support more weight with less deflection.

Two New Suspensions for Materials Handling Vehicles

TWO NEW RUBBER-TO-RUBBER suspension systems, just now being adopted by the trucking industry, give plant engineers unique versatility in design of plant material handlers—carts, tote-trucks and similar vehicles.

Both substitute rubber for spring-steel. And one permits a vehicle's "ride" to be custom-engineered on the spot.

Customized rubber-to-rubber suspensions do away altogether with leaf springs. Buoying the axles is a geometric rubber figure—the rhombus (a parallelogram whose angles are oblique). Eight rhombus-shaped, 3½-lb blocks of molded rubber cushion each axle. Swiss-cheesed with half a dozen ¾-in. diameter holes, the rubber rhombuses ride silky smooth, yet compress but a scant 2¾ in. under maximum axle load (up to 18,000 lb in highway trucks).

The other revolutionary rubber suspension supports each axle on four 6-in. high columns of neoprene O-rings. The O-rings, 3½-in. diameter, ¾-in. thick and stacked atop one another in a lubricated steel cylinder, act like rubber pistons. Though lightweight leaf springs bear the vehicle's no-load weight, under load the axles are supported solely by the doughnut-shaped O-rings. The system—designed to cushion delicate electronic gear—has registered an amazing 40 per cent smooth-out of bumps during Impactograph tests.

Literally pillowed in rubber are axles buoyed by the rhombic-rubber, no-spring suspension—dubbed Rubber-Spring Gear by its developer, Utility Trailer Mfg. Co., City of Industry, Calif.

Four rhombus-shaped blocks cushion the axle from below. Four identical rubber rhombuses cushion from above. The blocks—5-in. long and 3-in. wide—are compounded from a non-oxidizing synthetic and natural rubber mix.

Secret of the suspension's nearly shockless ride are its rubber rhombuses—whose odd shape is purposeful: installed on approximate 45-deg angles to the axle, they absorb load forces neither vertically nor horizontally, but angularly. Net result: far less vertical spring deflection, yet far greater than usual absorption of load forces.

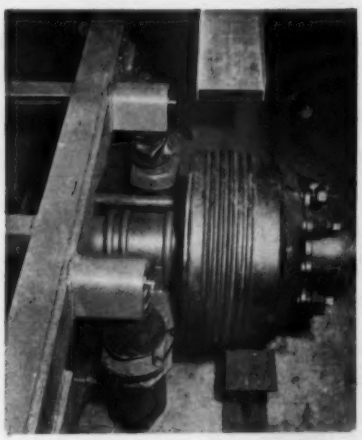
Explains an engineer, "You might say that the new rhombic suspension deflects less in the process of absorbing more."

More unusual: rhombic-blocks can be changed to custom-tailor the ride to fit the load they're carrying.

Suppose, for example, that a plant uses one materials handling vehicle to tote heavyweight raw stock and another to cart finished electronic consoles. Ideally, you'd

(Continued on page 178)

This photo shows how rubber rhombus works. This machine duplicates a truck's rhombic suspension. Wedge-shaped steel, center, represents axle which here is under 18,000 lb load. On either side of wedge are two solid rubber rhombuses set at 45 deg to axle.



Neoprene O-rings (under jackets, arrow) support axle. Although this suspension also utilizes leaf springs they are light-load bearers, holding only the truck's no-load weight. Once truck is loaded the O-rings take over. An alignment rod runs through O-ring holes.

Just 35 minutes from iron ore to finished steel

"INSTANT" STEEL—WILL

PLACE: your own plant engineering department.

Time: beginning right now.

Your assignment: quick-fabrication of a set of steel pipe brackets, custom-molded to the job . . . and to your plant.

Order in hand, you take from the shelf a wooden pattern . . . of the urgently needed brackets. Quickly you make a sand mold. Just as quickly, you chuck into a nearby, quart-sized furnace a dry mix of iron ore and an alloying compound. Thirty-minutes later the stuff—high grade steel—is molten. You tip the furnace, fill the mold. Quick-quenching your rough steel casting, you burnish it . . . and hand it to the pipefitters to install.

Forty-five minutes, start to finish, and you've shop-crafted those urgently needed steel brackets. You've made steel, moreover, by an astounding new direct - from - ore process. What's more, material costs for those brackets ran but 2 cents a pound.

Incredible? "Instant" steel is that . . . and more.

"Instant" steel, shop-brewed almost as quickly—and cheaply—as a cup of coffee, promises not only to turn the plant engineer into a do-it-yourself steelmaker, but his maintenance department into a fabricator of scores of plant-essential items . . . from doorstops to machinery base plates.

Acclaimed by usually hard-to-excite metallurgists, "instant" steel may prove the decade's single most important discovery . . . important to industry world-wide and just as important to you and your plant.

As one metallurgist sums it up, "As momentous as Goodyear's discovery of vulcanizing . . . and almost as accidental."

The "instant" process, discovered and developed by old-hand steelman Frank L. Madrigal, for 26 years foreman at Tulsa's Oklahoma Steel Castings Co., ends a century-long search for a one-shot, direct-from-ore steelmaking method . . . a method which bypasses costly blast furnace smelting and discards such steelmaking "essentials" as pig iron, scrap metal and coke.

Madrigal's method accomplishes the previously believed impossible: converts raw iron ore and alloys

STEP-BY-STEP PHOTOS OF MADRIGAL PROCESS . . .

Fig. 1. One of the two prime ingredients of "instant steel" is iron ore (its iron content about 40 per cent).

Fig. 2. Batched with iron ore is alloying compound which contains common steel ingredients plus ingredient X.

Fig. 3. Iron ore and alloying ingredient are mixed, weighed. Purpose: to determine how much iron is recovered.

IT AID MAINTENANCE?

Frank L. Madrigal, former superintendent, Oklahoma Steel Castings Co., Tulsa, with ingot of instant steel.

directly to steel. Moreover, the Madrigal process does the "impossible" in less than 40 minutes, start to finish.

The "instant" steel process is simplicity itself: you merely mix a couple of raw ingredients, turn them molten in a melting pot—and minutes later you have steel.

The oven-ready recipe:

Mix pulverized iron ore (containing perhaps 50 per cent iron) with a still secret "alloying" compound (a greyish powder) and heat to about 3000 F for about 35 minutes. The molten stuff you get is steel. And not just mill-run steel, but a product which one incredulous metallurgist declares, "Is as good, if not better, than the best available today." All of which explains why Madrigal's quick-steel is being tabbed as a missile metal.

The process—depending upon the formulation of the alloying compound which comes mixed-to-order and ready-to-use—makes any grade, type and hardness of steel (from the mildest to high-temperature stainless alloys).

At Glendale, Calif.'s Flotrusion, Inc., which extrudes heat-resistant steel tubing for aircraft and missiles, Chief Engineer Thomas F. Lindsay and his staff are busily engaged in putting Madrigal's process to the metallurgical test.

"Madrigal-made steel," enthuses cautious engineer Lindsay, "is easily handled . . . despite its high strength at elevated temperatures."

Anaheim, Calif.'s Aero Alloys, Inc., currently batching its own steel from the Madrigal mix, has already developed a custom-spec steel all its own (which retains 12,000-14,000 psi tensile strength, though subjected to 2000 F).

"The process," says one engineer, "is bound to turn many a small and specialized steel user into a make-it-yourselfer."

As for *your* plant shop-crafting from quick-steel such standard "housekeeping" items as brackets, guard rails, safety guards and scores of other items?

"Certainly many plant engineering departments will now, for the

SHOW SIMPLICITY OF "INSTANT STEEL" PROCESS . . .

Fig. 4. Iron ore and alloying powder are poured into induction furnace which has been heated up to 3000 F.

Fig. 5. Just 15 minutes from process' beginning, Madrigal studies molten steel, in furnace, with a pyrometer.

Fig. 6. Sixteen minutes from beginning of process the first of three slagging operations ousts impurities.

first time, be making their own," declares another engineer.

And he adds, "Costs being what they are, it's hard to imagine that plant men won't leap at the chance not only to cut dollars from hundreds of easily molded items . . . but to customize their plant-used hardware."

Nobody expects, of course, that plant engineers will fabricate intricate or highly machined parts. But the experts—including some executives of Big Steel itself—predict that hundreds of plants will now take to making and molding many a plant-common part.

On the broader outlook is the matter of customized, designed-to-fit-*your*-plant parts. Quick steel enables plant engineers to "customize" their facilities . . . to mold steel items which aren't available.

Many a purchased steel item in today's plant is, engineeringwise, a kind of compromise. It fits the job, but not the plant. It does what it's designed to do, but not as well as if it were specifically molded for a specific plant and for a specific place in that plant.

But larger yet looms the process' bread-and-butter advantage: its low cost.

For example, whereas a pound of high-grade steel, unmachined, is price-tagged from 4 to 8 cents (on a tonnage basis), you can make your own steel, in pint-sized quantities or even in tons, for a little less than 2 cents a pound.

The economies are obvious: the Madrigal process short cuts one of steelmaking's costliest steps: ore smelting. And about 1400 lb of costly coke alone goes into a single ton of today's good grade steel.

What will it cost your plant to make steel enough for many of its job-common housekeeping items? The equipment cost need run no more than about $1000—for a small propane-fueled furnace. Better—but far more costly—is the ideal: an electric induction furnace, its capacity about 30 lb of steel per cycle (that is, you can make 30 lb of steel at a time).

Typically, if the basic ore that goes into a make-it-yourself steel batch contains but 50 per cent iron, to produce 1 ton of steel you'd need two tons of ore (since it contains only one ton of iron) plus about 600 pounds of Madrigal's "alloying" additive.

Ore with a 50 per cent iron content delivers to a plant's door for $8-$12 a ton. So two tons would cost the make-it-yourselfer $16-$24. Madrigal plans to supply the "alloying" compound, batched to a user's steel specifications . . . for a modest one cent a pound, or $6 for the necessary 600 lb. Dump it into a large furnace and in less than 40 minutes you have a ton of steel, its material cost tabbed at $30-35 (compared to $50-$60, today's basic materials cost for a ton of commercially-made steel).

Cost? 2 Cents

Thus, cost of Madrigal-process "instant" steel is less than 2 cents a pound.

Suppose we take a closer look at how you and your department would, in the coming era of shop-made steel, turn out those urgently needed pipe brackets.

To custom-make the steel brackets, you'd begin with a simple wooden pattern. From it, you'd

EXPLAIN ITS LOW-COST POSSIBILITIES . . .

Fig. 7. Time-clocked 23 minutes from the beginning of the process. After three slagging-offs, Madrigal balls aluminum foil on rod to rid the steel of its oxygen.

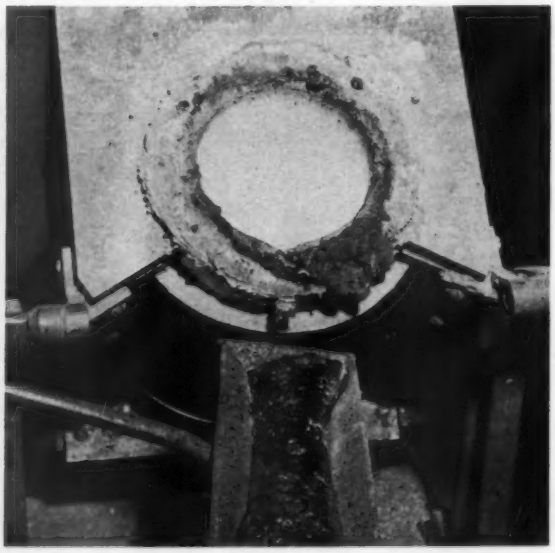


Fig. 8. Twenty-five minutes from start, molten steel is poured from furnace. Quickquenched, it'll be ready for forming, working or burnishing. Mold is for pour-off.

make a sand mold (exactly as does a foundry). Mold completed, you'd mix a batch of quick-steel . . . and minutes later have your rough steel casting.

The only required addition to your present shop: a furnace capable of melting iron ore (iron melts at about 2790 F). Currently available for modest-sized jobs (those brackets, for example) are lab-sized furnaces which attain 3000 F and cost $500-$600. To attain 3000 F, most are fueled by propane, boosted by pure oxygen.

What's the Recipe?

As for batching "instant" steel? Actually, almost no work at all is required. Reason: only three basic ingredients make up a reciped batch of Madrigal steel:

Iron ore, containing 40 to 60 per cent iron and pulverized to pass a No. 20 mesh, constitutes 50 to 75 per cent of the total mix.

Fluxes—limestone, silicates or fluorite—comprise 5 to 6 per cent of the mix (and are contained in the alloying compound, which comes ready-mixed). Fluxes, common to most steelmaking processes, speed the reaction of metals and minerals.

Alloying Compound—representing the remainder of the batch—contains not only the usual ingredients for removing, adding to or controlling steel's impurities, but Madrigal's still-secret "X" ingredient . . . which, in essence, does the work of coke, thus does away with the need for blast furnaces and smelting.

No Secrets Here

Madrigal, now 72, scoffs at the idea that there are any "secrets" in his chance discovery.

"The alloying compound," he says, "has been analyzed by hundreds of chemists. It's simply that, until patents are granted and the process secure, I'd rather not talk in terms of specific ingredients."

"Instant" steel's discovery—which may very well go down as among industry's and history's most important—was accidental.

Fig. 9. This finished ingot of high-grade "instant steel" is weighed in order to determine the actual percentage recovery of steel from the iron ore used.

Retiring after a lifetime spent in the U. S. steel industry (Madrigal was superintendent of works at Oklahoma Steel Castings Co. at time of retirement in 1948), he returned to his native Mexico to "putter."

Puttering one July day in 1950, he was batching ferro-manganese, whose processing closely resembles the technique used to convert raw iron ore to pig iron.

Midway through the process, he found himself short of one essential ingredient. On a hunch—or more likely out of desperation—he chucked into the furnace an ingredient he considered a close substitute for the one he lacked. This was—and is—ingredient X.

Minutes later when he poured the molten potion into a mold, he gasped in astonishment. The stuff wasn't iron at all . . . but steel.

During the ensuing nine years, Madrigal continued to experiment. Now, backed by International Ore Processing Co., he plans to franchise the process and market the essential "alloying compound" . . . at approximately a modest penny a pound.

There is little question but what the process—a remarkable milestone in metallurgy and industry—will bring major changes to many a plant engineering department.

Admittedly, many an old-hand metallurgist still finds it hard to believe that so major a discovery has come so late . . . and by such accident.

Says a metallurgist for Los Angeles' Metal Control Laboratories, Inc., among the nation's largest independent metals-testing firms, "According to the books and to accepted theory, you simply can't make steel this way . . . but the Madrigal process does."

Shortly, plant engineers everywhere may be customizing hundreds of items of "housekeeping" hardware. For "instant" steel shop-brewed almost as quickly—and cheaply—as a cup of coffee, promises to turn plant engineers and their departments into do-it-yourself steelmakers. **End**

A NEW SERIES . . .
Construction Cost Estimating

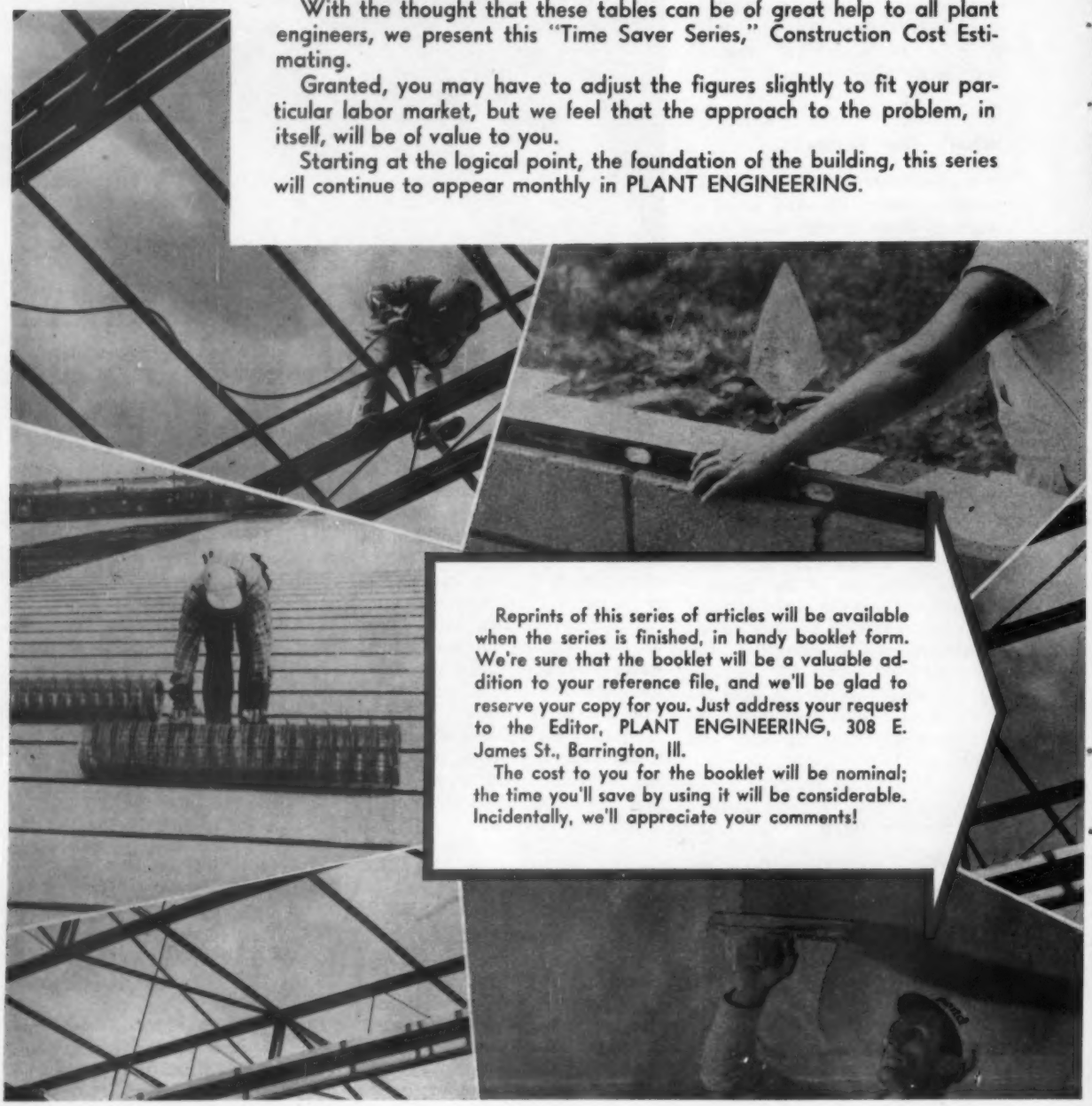
WHEN A PLANT ENGINEER is asked to supply general management with the cost figures for a new building, a new plant, or an addition to an existing building, he isn't often given "all day" to come up with the answers.

Our author, John Gilroy, after being faced with the need to figure and re-figure unit costs each time he was asked for an estimated cost on a building project, devised a series of tables on installed unit costs of various building materials.

With the thought that these tables can be of great help to all plant engineers, we present this "Time Saver Series," Construction Cost Estimating.

Granted, you may have to adjust the figures slightly to fit your particular labor market, but we feel that the approach to the problem, in itself, will be of value to you.

Starting at the logical point, the foundation of the building, this series will continue to appear monthly in PLANT ENGINEERING.



Reprints of this series of articles will be available when the series is finished, in handy booklet form. We're sure that the booklet will be a valuable addition to your reference file, and we'll be glad to reserve your copy for you. Just address your request to the Editor, PLANT ENGINEERING, 308 E. James St., Barrington, Ill.

The cost to you for the booklet will be nominal; the time you'll save by using it will be considerable. Incidentally, we'll appreciate your comments!

For the Plant Engineer
Involved in Construction . . .

A Plant Engineering Time Saver Series

CONSTRUCTION COST ESTIMATING

From foundation to flagpole, industrial buildings cost money. When the plant engineer is asked . . . "how much?" . . . by his management, the unit costs presented in this Time Saver Series will be a valuable aid.

Here, in a single source, are the costs for units of foundation, steelwork, siding, roofing, block and brick, windows and sash, flashing, plumbing, interior walls, floors and ceilings.

time saver series

CONSTRUCTION COST ESTIMATING PART 1

CONCRETE FOUNDATIONS

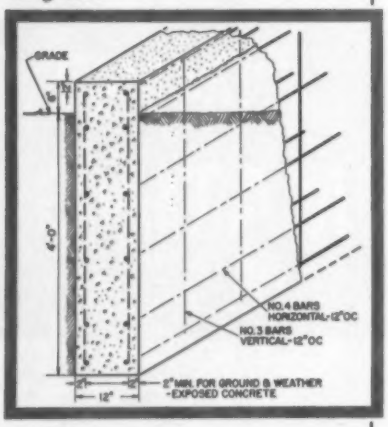
SPANDREL WALL

To estimate the cost, including overhead and profit, of any spandrel wall, use the following factors. Just multiply the quantities of material times the factor for each, and the sum of these results will give the total cost for the job.

Cost of

CONCRETE .....cu ft x $.722
FORMS .....sq ft x .696
FINISHING .....sq ft x .153
GRADING .....sq ft x .153
TRENCHING ....cu ft x .064
REINFORCING ....lb x .132
BACKFILL .....cu ft x .096

The table shows how the actual cost of a 12-in.-wide spandrel wall is figured.



Description of work	Dimensions (ft) L	W	D	Extension	Material Cost Unit	Total	Labor Cost Unit	Total
CONCRETE	1	1	4.5	4.5 cu ft	.47	2.12	.10	.45
FORMS	1		4.5	9.0 sq ft	.12	1.08	.36	3.24
FINISH	1	1		1.0 sq ft			.10	.10
GRADE	1	1		1.0 sq ft			.10	.10
EXCAVATION	1	3	4	12.0 cu ft				
BACKFILL	1	2	4	8.0 cu ft	.052	.42	.022	.176
COMPACTION				.8 cu ft	.052	.04	.022	.018
TOTAL						3.66		4.08
OVERHEAD					10%	.37	20%	.82
INSURANCE, Etc.							16%	.78
TOTALS						4.03		5.68

Excavating: $.70 per linear foot
Reinforcing: 12 No. 4 rods,
0.668 lb per ft=8.02 lb. Add 8% lap ..... 8.66 lb
2 No. 3 rods, 4 ft long, per ft
0.376 lb per ft ..... 3.01 lb
11.67 lb

11.67 lb, at $.12 per lb = $1.40
Material and Labor Cost:
$4.03 + .70 + 1.40 + 5.68 = $11.81
Profit, 10%: $1.18
Total Cost per foot of 12-in.-wide spandrel wall $12.99
per foot of 8-in.-wide spandrel wall $11.99
Excavating and reinforcing subcontracted.

These costs, and all those in this series, can be kept up-to-date by reference to the "Engineering News Record" Building Cost Index. All calculations are based on an index of 525.

JOHN GILROY graduated from Purdue University in 1934, with a B.S. degree in Mechanical Engineering. After graduation, he served his apprenticeship as a steamfitter-welder with the Illinois Central Railroad, then assumed the position of Special Engineer.

In 1942, he left Illinois Central to become Chief Engineer of the Wyman Gordon Company, Ingalls-Shepard Div., Harvey, Ill.

Mr. Gilroy joined the Harnischfeger Corporation, Milwaukee, in 1955, as Chief Plant Engineer. In this position, he handles design and construction of buildings, and supervises various types of expansion projects within the company facilities.

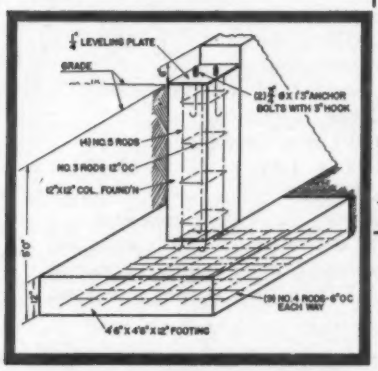
COLUMN FOOTING

To estimate the cost, including overhead and profit, of any size of column footing, use the following factors. Multiply the quantities of material times the factor for each, and the sum of these results will give the total cost for the job.

Cost of

CONCRETE .....cu ft x $.722
FORMS .....sq ft x .657
FINISHING .....sq ft x .015
GRADING .....sq ft x .153
EXCAVATING ..cu ft x .102
BACKFILL .....cu ft x .096
REINFORCING ....lb x .132

The table shows how the actual cost of a footing (4.5 ft by 4.5 ft by 1 ft) is figured.



Description of work	Dimensions (ft) L	W	D	Extension	Material Cost Unit	Total	Labor Cost Unit	Total
CONCRETE	4.5	4.5	1	20.25 cu ft	.47	9.52	.10	2.03
FORMS	4.5		1	18.00 sq ft	.10	1.80	.35	6.30
GRADE	4.5	4.5		20.25 sq ft			.10	2.03
FINISH	4.5	4.5		20.25 sq ft			.01	.20
EXCAVATION	5	5	5	125.00 cu ft				
BACKFILL				100.75 cu ft	.052	5.24	.022	2.22
COMPACTION				10.00 cu ft	.052	.52	.022	.22
TOTAL						17.08		13.00
OVERHEAD					10%	1.71	20%	2.60
INSURANCE, Etc.							16%	2.50
TOTALS						18.79		18.10

Excavating: $2.50 per cu yd; $.093 per cu ft, 125 cu ft = $11.63
Reinforcing: 18 No. 4 rods, 4 ft long; 58.78 lb, $.12 per lb = $7.05
Total Material and Labor Cost:
$18.79 + 18.10 + 11.63 + 7.05 = $55.57
Profit, 10%: $5.56
Total Cost for footing: $61.13
Excavating and reinforcing subcontracted.
Backfill volume is determined by subtracting the volume of the footing (20.25 cu ft) and the volume of the pier (4 cu ft) from the excavation volume (125.00 cu ft).

COLUMN PIER

To estimate the cost, including overhead and profit, of any size of column pier, use the following factors. Multiply the quantities of material times the factor for each and the sum of these results will give the total cost for the job.

Cost of

CONCRETE.....cu ft x $.722
FORMS.....sq ft x .987
FINISHING.....sq ft x .153

Cost to

SET 1 BOLT.....2.297
SET PLATE & GROUT..4.070

Cost of

REINFORCING.... lb x .132
PLATE..... lb x .220
FOUNDATION BOLTS..... lb x .330

The table shows how the actual cost of a pier (1 ft by 1 ft by 4 ft) is figured.

Description of work	Dimensions (ft) L	W	D	Extension	Material Cost Unit	Total	Labor Cost Unit	Total
CONCRETE	1	1	4	4 cu ft	.47	1.88	.12	.48
FORMS	1		4	16 sq ft	.12	1.92	.55	8.80
FINISH	1	1					.10	.10
SET BOLTS				2			1.50	3.00
SET PLATE & GROUT				1	.20	.20	2.50	2.50
TOTAL						4.00		14.88
OVERHEAD					10%	.40	20%	2.98
INSURANCE, Etc.							16%	2.86
TOTALS						4.40		20.72

Reinforcing: 4 No. 5 rods, 4.5 ft long, per ft;
18 ft, 1.043 lb per ft ..... 19 lb
4 ties, No. 3, 4 ft long, per ft; 16 ft, .376 lb per ft ..... 6 lb
25 lb

25 lb, $.12 per lb $3.00
Setting Plate: 1 ft by 1 ft by ¼ in.; 10.2 lb, $.20 per lb . 2.04
Bolts: Two, ¾-in. by 15 in., 3-in hook; $.75 each 1.50
$6.54

Material and Labor Cost: $4.40 + 6.54 + 20.72 = 31.66
Profit, 10%: $3.17
Total Cost for Pier: $34.83
Reinforcing subcontracted. Base plate furnished with column.

CONTINUOUS FOOTING

To estimate the cost, including overhead and profit, of continuous footing under a spandrel wall, use the following factors. Multiply the quantities of material times the factor for each, and the sum of these results will give the total cost for the job.

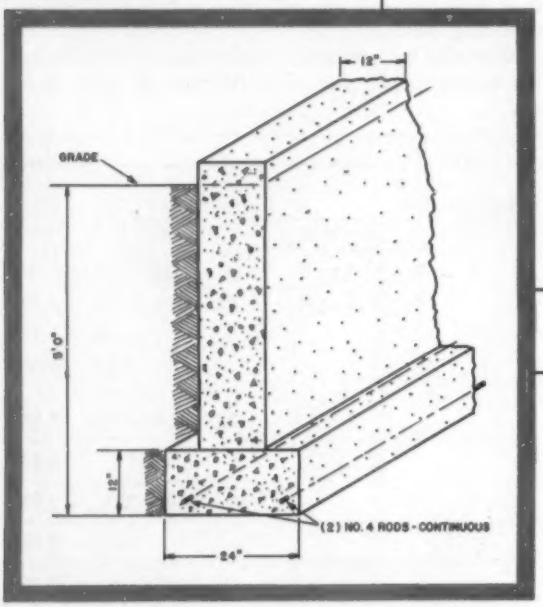
Cost of

CONCRETE .....cu ft x $.722
FORMS .....sq ft x .657
FINISHING .....sq ft x .015
GRADING .....sq ft x .153
EXCAVATING ..cu ft x .064
BACKFILL .....cu ft x .096
REINFORCING ....lb x .132

The table shows how the actual cost of footing 2 ft wide, 1 ft thick, is figured.

Description of work	Dimensions (ft) L	W	D	Extension	Material Cost Unit	Material Cost Total	Labor Cost Unit	Labor Cost Total
CONCRETE	1	2	1	2 cu ft	.47	.94	10	.20
FORMS	1		1	2 sq ft	.10	.20	.35	.70
FINISH	1	2		2 sq ft			.01	.02
GRADE	1	2		2 sq ft			.01	.20
EXCAVATION	1	4	5	20 cu ft				
BACKFILL				14 cu ft	.052	.728	.022	.308
COMPACTION				1.4 cu ft	.052	.073	.022	.031
TOTAL						1.941		1.459
OVERHEAD					10%	.194	20%	.292
INSURANCE, Etc.							16%	.280
TOTALS						2.135		2.031

Excavating: subcontracted, at $1.58 per cu yd
20 cu ft, at $.0584 = $1.17
Reinforcing: subcontracted
2 No. 4 rods, two ft long, .668 lb per ft
1.336 lb, $.12 per lb = $.16
Total Material and Labor Costs:
$2.135 + 2.031 + 1.17 + .16 = $5.49
Profit, 10%: $.549
Total cost for footing: $6.04 per linear foot
Backfill volume is determined by subtracting the volume of the footing (2 cu ft) and the volume of the pier (4 cu ft) from the excavation volume (20 cu ft)



The following considerations apply in each of the four construction types on these pages:

1. Costs are based on six-bag concrete mix, $12.60 per cu yd. Price varies $.90 per bag of mix.
2. Reinforcing steel is figured at $185.00 per ton, with placing cost $60.00 per ton; total cost is therefore $245.00 per ton or $.12 per lb.
3. Backfill is bank run gravel, $1.40 per cu yd or $.053 per cu ft.
4. Grade refers to the leveling of the bottom of the trench before pouring concrete.
5. Form usage, three times.
6. Excavated material stockpiled on property.

GENERAL CONSIDERATIONS

The concrete factor, $.722, used in all calculations, is obtained by the following analysis:

Unit cost of concrete per cu ft	$0.47	
Overhead; 10% of material cost	.047	
		$.517
Labor cost of placing one cu ft of concrete	.10	
Overhead; 20% of labor cost	.02	
	.12	
Insurance, etc.: 16% of labor cost	.019	
Total labor cost		.139
Total material and labor costs		.656
Profit, 10%:		.066
Cost of one cu ft of concrete, in place		$.722

SMALL PLANT DISASTER PLAN—
Planning, Practice Pay Off in ANY Emergency

By GEORGE E. DRISCOLL, Fire Protection Consultant, Morristown, N. J.

Organization of key personnel and control center can be modified to suit plant. Equipment suggested is for small plant.

IF THERE WERE an air raid tonight, would your plant be prepared to meet the emergency?

Providing you are at home with your family you are fortunate. However, your employees on the night shift are not so blessed since they are at your plant working under the assumption that you have made plans to protect them during the emergency and they have every right to that assurance. The welfare of the employees is your responsibility.

The government and civil defense authorities have published many pamphlets on industrial civil defense covering protection on all size plants.

Shelter areas should be underground if possible or an enclosure away from windows, high pressure steam lines, high voltage wiring, flammable liquids and highly combustible materials. Each plant has its individual problems in selecting shelter sites; however, each site should be clearly posted and should allow five to 10 sq ft per person. There should be at least two exits.

Each facility should be divided into zones, floors or departments for the establishment of warden posts. If possible, each warden should have one or two runners to assist him. The wardens, runners, stretcher bearers and firemen should wear helmets and arm bands for identification purposes.

The plant fire department is the nucleus of your program and its members should be assigned to the vital areas since they know the location of your power lines, gas lines, sprinkler valves and fire equipment. Your mobile fire, rescue and salvage equipment should be dispersed throughout the plant at strategic locations to prevent it from being inaccessible due to roads being impassable.

The Control Center is the nerve center of your organization and should be located underground. The key personnel are assembled there and the responsibility for the entire program rests upon their decisions. For example, if several buildings are ablaze and due to manpower shortages or inadequate water supply only one fire can be extinguished, Control Center personnel must decide which building is most valuable to the plant. If employees are endangered in a certain area the Control Center summons aid.

Discovery of an unexploded missile near a building or shelter area would require wardens to evacuate personnel from that area immediately.

As the warning signal is received the wardens, runners, stretcher bearers and firemen hasten to their previously assigned posts and direct their charges to the shelter areas.

The designated officials will gather in the Control Center and a code word will be put in use for all telephone conversations to assure proper identification of the calling party, to prevent the dissemination of false or misleading information. Information coming to or from the Control Center via telephone that appears unusual should be verified by immediately calling back the party who originated the call.

The disruption of telephone service can be anticipated under an attack and in this event lines of communication will be restored by employing the runners.

At the all clear signal the firemen will make a thorough inspection of all buildings and fire equipment. The wardens and runners will check their lists of personnel and the

(Continued on page 176)

Courtesy Toledo Scale Co.

Fig. 1. These large paper rolls are being weighed as they move along on the conveyor. The double-faced dial indicator permits reading the weight from either the front or the back of the scale.

Many steps saved because . . .

MATERIALS ARE WEIGHED WHILE IN MOTION

Weighing time and additional handling can be reduced by employing built-in weighing systems in your operations

By A. T. GAUDREAU, Consultant, Gaudreau Associates, Westport, Conn.

MEASURING THE materials of industry by weight calls for accuracy and control with a minimum of handling. The styles of scales available to serve the weighing functions of industry run into the thousands. When properly selected and integrated into the flows of materials through the production cycle, modern scales can convert weighing functions into incidental pauses in material movement without adding to existing handling functions.

Carrier-mounted Scales

As materials are being transported in a plant or warehouse, they frequently need to be weighed at point of departure, at a by-station, or at destination. In many cases the loads have to be diverted to points where platform scales are located, and then transferred on and off the scale platform to be weighed.

Carrier-mounted scales have been developed, however, which entirely eliminate the handling of a load on and off a scale. They integrate the weighing function into the transportation operation, and thereby weigh the material while in transit. This is done along the regular flows of material through production or warehousing, and thereby also dispenses with the need of diverting loads from lines of travel in order to get them weighed.

Some of these scales are mounted in a permanent location within the main flows of travel. This is particularly desirable in the case of transportation by conveyor or monorail. The rapid weighing of large rolls of paper in transit on a roller conveyor is illustrated in Fig. 1.

The roll moves on the detached scale section of the conveyor during the normal flow. As it passes over this section without interruption or diversion, its weight is automatically determined and recorded. The roll then continues toward its destination without having incurred any handling at the weigh station.

Similar weighing installations can also be integrated into overhead monorail tracks and overhead trolley conveyors. Overhead track scales are made to work in conjunction with these two types of

transportation system. As illustrated in Fig. 2, the overhead track scale is designed to weigh materials suspended from above while being moved about the plant. These scales are available for weighing objects up to about 60,000 lb. Weight indication may be on automatic dials or beams.

Scales mounted on conveyor or monorail lines are fixed in position at strategic points along the normal flow lines of materials. When material is being transported by traveling bridge cranes or mobile equipment, such as powered lift trucks, the scale usually travels with the load being weighed.

Crane lifts can thus be weighed in transit by means of a scale installed between the crane hook and the load. By this method, the scale weighs the load automatically as soon as it is lifted off the floor. Crane scales are available in all types of weighing and weight-reading, including remote indication.

Another example of how carrier-mounted scales can eliminate material handling motions and time is with a built-in scale on a lift-truck. These scales are actuated directly by the hydraulic pressure that lifts the load.

Electronic Weighing

Motion-weighing track scales for railroads, steel mills, and other large industrial establishments are constructed by mounting load cells in a concrete pit, and placing a conventional type of weighbridge on top of the cells. The tension exerted on these load cells is measured electronically and translated in tonnage on a remote register.

The load cell principle of weight determination has found successful application in almost every one of the basic types of industrial scales, including the small-size portable units. Load cells are not scales in themselves, as may be observed in Fig. 3. They are simply small devices, usually cylindrical in shape, that are sensitive in stress.

Motion-weighing track scales are but one type of scale adapted to the use of load cells. Other types of modern industrial scales employing the load-cell principle include crane scales, monorail track scales, tank and hopper scales, predetermined-weight scales, conveyor scales, and various types of continuous-weighing systems and proportioning methods.

Scales for Bulk Materials

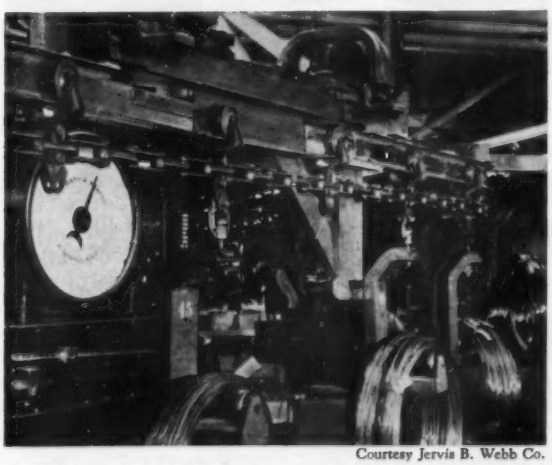
The handling of bulk materials in receiving, storing, reclaiming, feeding, blending, batching, proportioning, filling and packaging operations requires accurate measuring, usually by weight, at every stage. For the most part, these bulk materials are received into and fed out of storage tanks for liquids and storage hoppers for dry bulk materials. Many of these materials have to be weighed continuously. The containers or devices used for supporting the loads of materials being weighed continuously may be tanks, cylinders, hoppers, weighing platforms, or the traveling belt on conveyors.

Tank and hopper scales, in general, are used for weighing large quantities of liquid or dry bulk material contained in tanks or hoppers. To facilitate the weighing of these materials, these scales are permanently affixed to the tank or hopper they serve.

Tank or hopper scales are either manually operated, or are automatic batching scales. They are further divided into suspended or floor varieties, depending upon whether the weighing elements are hung from above or rest on or below the floor. When load cells are used as the weighing elements with permanent tanks and hoppers, reasonable accuracy in weighing is obtained by simply mounting a pair of load cells at one end, and using the support at the other end as a hinge. The capacity of tank and hopper scales ranges from 500 to 300,000 lb.

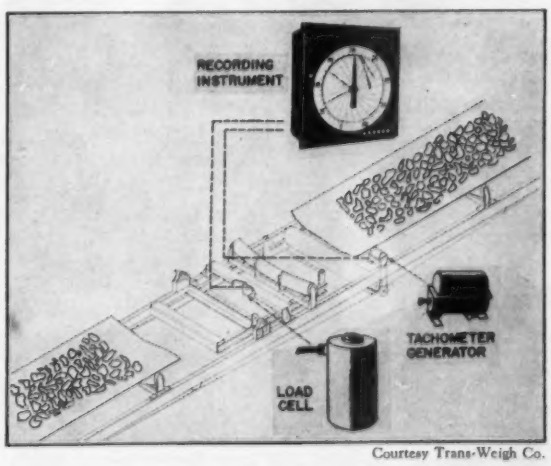
Or the tank and hopper scales may be mounted on carrying devices, such as on a charging car or a traveling larry. The recording scale beam on a traveling weigh larry is located near the floor within easy reach of the operator. When used in mixing operations, weigh larries may be operated on two or more separate tracks for routing to mixers when loaded.

In net weighing and filling operations, bulk material is usually fed by conveyor, such as the screw-type unit, from storage bins into a



Courtesy Jervis B. Webb Co.

Fig. 2. Overhead trolley conveyor scale weighs coils of wire as they pass by the scale section, shown in the left foreground.



Courtesy Trans-Weigh Co.

Fig. 3. Sketch of an electronic belt-conveyor scale equipped with load cell, tachometer generator and weight-recorder.

hopper equipped with a scale. Or the material may be fed continuously by a vibratory or belt feeder, and flow controlled electronically.

The least complicated net weighing and filling system is the single hopper net weigher that fills one container at a time with a single filling spout illustrated in Fig. 4.

Even in its simplest form, the net weighing and filling unit is semi-automatic through the force of gravity feed. The weighing and tripping operations become automatic when counterbalance is achieved. With the addition of appropriate control mechanisms, this unit has been developed into one that is fully automatic, and either semi-continuous or continuous in operation.

High-speed packing machines have been developed that feed and set up carton blanks, seal the carton bottom, weigh the material, fill the package, and close the top of the carton at speeds up to 300 packages a minute.

Conveyor batching scales use the weigh conveyor itself as the scale platform, or weighing receptacle, to weigh automatically and repetitively a preset quantity, or load, of loose materials, illustrated in Fig 3. The weighing carriage in this particular system supports a length of the conveyor belt, and contains an electric load cell.

While a weigh conveyor operates in cycles, there is only a brief intermittent break when the registering of the correct weight on the scales sets the control device in motion to stop the flow from the feed conveyor. The operation discharges a practically continuous stream of material for the next step in the processing flow.

Continuous weigh feeders are used for feeding various materials through one or more processes. They are also used for the batching of a single material, the continuous proportioning of a series of materials, or the continuous weigh-feeding of a single material in loading carriers.

The endless traveling belt, a feed hopper, and a scale beam generally connected to the hopper gate, are standard items on most continuous weigh feeders. In many models, electrically-operated feed gates are available to replace the mechanical models. Some have magnetic contacts at the end of the scale beam or elsewhere which either speed up or slow down the feed to compensate for the error when the apparatus is unbalanced.

Floor-level Weighing

Loads in excess of 2000 lb are weighed on fixed platform scales mounted in a pit under the floor or ground level. Such loads range up to 300 tons, and the floor scales on which they are weighed vary in design according to the following maximum capacities:

Self-contained floor scale	3 tons
Built-in floor scales	10 tons
Truck axle-load scales	30 tons
Motor-truck floor scales	60 tons
Railroad track scales	300 tons

All of these floor scales are installed with the scale platform at floor level, and are designed for stationary mounting. By thus eliminating the lifting of materials on and off the scale platform, weighing operations are speeded up. Self-contained floor scales, such as the one illustrated in Fig. 5, have a completely self-supporting lever system integrated into the scale frame.

Built-in floor scales are constructed like self-contained floor scales, but their supporting levers enable them to handle bigger loads; namely, up to 10 tons. These scales can be placed at strategic locations in the flow of material to enable them to weigh the material without unloading it from the transporting unit. By merely stopping a load-carrying fork truck on the scale platform, for example, the net load may be read directly from the dial by simply adjusting the tare beam to the weight of the fork truck itself. **End**

Courtesy Richardson Scale Co.

Fig. 4. Weighing hopper discharges fertilizer into waiting bag. Belt-feed scale built in hopper controls proper weight.

Courtesy Yale & Towne Mfg. Co.

Fig. 5. Fork truck driver deposits large case on self-contained floor scale before it is placed in the plant storage area.

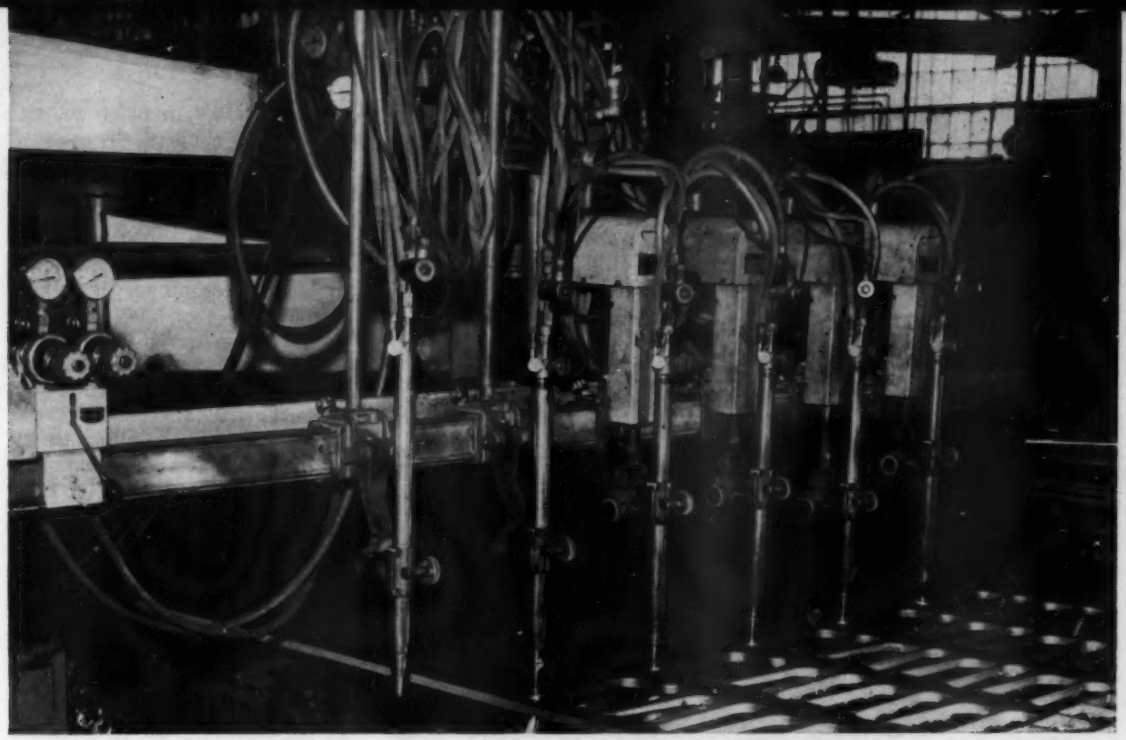


Fig. 1. Multi-torch cutting of steel, using natural gas in injector-type torches. Hi-Lo control mounted at extreme left.

How About FLAME CUTTING With NATURAL GAS?

Cost study indicates it can give better cuts at lower cost

By JOHN GILROY, Chief Plant Engineer and RAY FISH, Bridge Shop Superintendent; both of Harnischfeger Corp., Milwaukee

FLAME CUTTING of steel can be done with any hydrocarbon gas, burning either in air or oxygen. That is, it can be done with any gas capable of bringing the temperature of a localized spot of steel to approximately 2000 F. Acetylene gas, made by adding water to carbide, has been most generally used, but the price of carbide has risen to a point which dictates consideration of other fuel gases for oxygen flame cutting.

There are several factors to be taken into consideration as to whether it is cheaper to use natural gas in place of acetylene for the preheat flame. Among them: is the acetylene being purchased in cylinders; is it being generated on the plant site; on what applications will it be employed?

Oxygen Requirements Increase

A fuel cost saving of 15 to 25 per cent can be obtained using natural gas over acetylene on machine-controlled plate cutting. However, the oxygen consumption will increase 5 to 15 per cent. Since this is true, a complete evaluation of individual gas and oxygen costs must be made in all comparisons.

Oxygen in cylinders costs about $1.00 per 100 cu ft, while from a bulk installation the cost can be as low as $0.37 per 100 cu ft (depending upon the sliding scale used for larger volumes). Generated acetylene costs can be as low as $1.00 per cu ft while in cylinders the cost is about $3.00 per 100 cu ft.

The following figures show the savings that were made substituting natural gas for acetylene on cutting out the clutch outer member shown

Fig. 2. Special application of cutting with natural gas flame. Teeth in this eight-inch-thick gear were flame cut. Job took 45 minutes, removed 525 lb of metal.

in Fig. 2. This is an eight-inch section and takes 45 minutes to cut out. The weight of the original piece is 975 lb and the final weight 450 lb.

Acetylene—24 cu ft at	
$0.018 per cu ft	$0.432
Oxygen—30 cu ft at	
$0.0039 per cu ft	0.117
	$0.549
Natural Gas—19.5 cu ft at	
$0.00097 per cu ft	$0.0189
Oxygen—39 cu ft at	
$0.0039 per cut ft	0.1521
	$0.1710

Natural gas saved $0.378 in fuel cost on this one piece.

Natural gas produces a cleaner cut, with sharper top edges. It is possible to cut narrower shapes and contours in relatively heavy sections, because the lower temperature preheat does not melt down the top edge of the cut. The slag is generally not as tight and is easier to remove. Also, natural gas gives cleaner working conditions in the shop, since no carbon stringers or cobwebs form, as when using acetylene.

Cutting speeds are generally equal to or better than acetylene, provided the metal thickness is over 3/16 in. and the material is not too rusty and does not have too heavy a mill scale. These speeds are obtainable when used on center piercing or edge starting—natural gas may be found to be slower when there are a great many starts and stops, such as are necessary in billet cutting. Natural gas is not generally as satisfactory for cutting sprues on castings due to the irregular surfaces, surface oxides, and sand inclusions; nor is it always satisfactory for bevel cuts without slowing the cut and closely controlling flame impingement.

When using natural gas for preheating prior to and during the cutting operation, a preheat controller is recommended. This may be manually, electrically, or automatically controlled by pressure differential. A type that controls both the oxygen and the fuel gas being used will produce the best results. This latter type of preheat controller will also produce substantial savings when employed by acetylene.

The Duplex Hi-Lo control is a gas regulating device that we inserted in the fuel gas and preheat oxygen lines between the torches and the regulators which normally supply the torches. It incorporates separate fuel and oxygen regulators that are adjusted to the Lo setting and valved bypasses that control the Hi setting. A single lever operates both bypass valves simultaneously without interrupting gas flow. Independent fuel and preheat oxygen systems permit the use of very heavy preheat at Hi to accommodate fast starting, and light preheat flames at Lo to aid in quality cutting. Gas ratios at the two positions can be set independently. Figure 3 shows the schematic arrangement of the equipment.

Acetylene burns with the highest

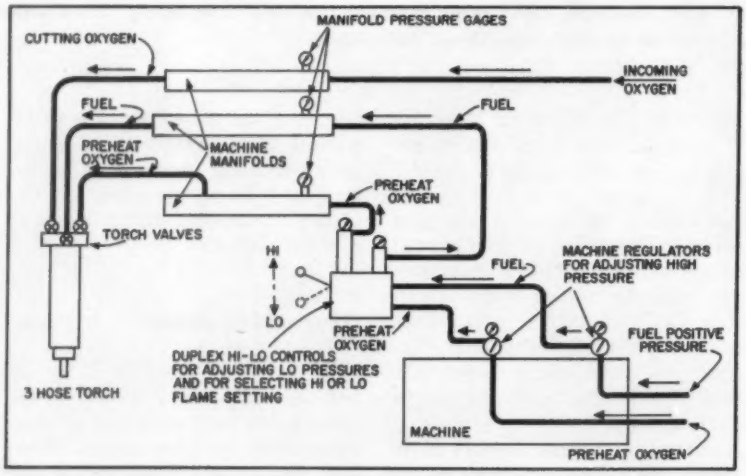


Fig. 3. Flow diagram of duplex Hi-Lo control regulator used on three-hose torch.

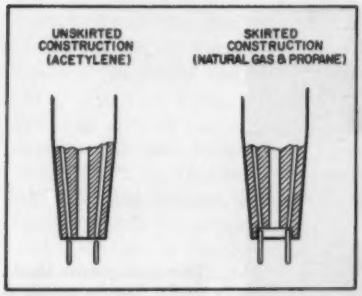


Fig. 4. Construction differences in tips used for burning acetylene, natural gas.

velocity of any fuel and consequently burns with the highest temperature. Propane has a higher Btu value than acetylene but has a lower flame temperature due to its slower combustion with oxygen. However, it is widely used and is an excellent fuel to use for preheating and heating steel for bending and shaping.

Natural gas, while satisfactory for large volume heating, is slower for most preheating applications and is subject to five to 15 per cent increase in oxygen requirements in relatively high volumes. When straightening steel, natural gas has advantages: its "soaking" heat will not melt the steel; there is no chance of a flash back (which might cause the torch to explode).

The use of natural gas as a fuel for flame cutting has been stimulated by development of improved mixers that will burn large volumes of gas and improved tips and nozzles to handle the volume required to offset lower flame temperature. Satisfactory results are obtained using both balanced-pressure type mixers and injector-type mixers that siphon the fuel gas in proportion to the oxygen flow.

Balanced-pressure types of mixers require higher fuel gas supply pressures for best performance—generally in the area of five pounds per square inch. Low supply pressures can be boosted by a pump, but this has certain disadvantages. Injector-type torches will work at a half-pound pressure or less but generally perform somewhat better in the area of two to five pounds supply pressure so that they may be regulated down to a half pound or less pressure, at the torch itself. In both cases supply lines should be of maximum size right up to the torch connection.

To convert an acetylene torch to natural gas need not be expensive—it depends on the equipment selected. If the present acetylene equipment can be converted by mixer changes, typical cost is about $15.00 per torch for the mixer. New nozzles or tips cost about $5.00 per tip. The suggested preheat controller is in the area of $100.00. A supply line regulator varies considerably but costs less than an acetylene regulator.

The proper size tip should be used according to the metal thickness, quality of cut desired and cutting speed. While using natural gas we have successfully cut steel 3/16 in. to 16 in. in thickness at speeds equal to or faster than those possible with acetylene. We have operated six torches simultaneously on material ranging up to 4-in. thickness.

Multiple-Torch Cutting

All of our multiple-torch machines have been converted and we are now converting the rest of our small shape-cutting machines. We have started to use natural gas on our straightening operations, especially with alloy steels where the heating has to be more closely controlled. We will continue to use acetylene for operations where its higher flame temperature does the better job. However, on those operations where lower flame temperatures are satisfactory and economically competitive or superior, we will use natural gas, liquefied petroleum gas (propane or equivalent) or any other gas. Each application will stand on its own from a performance and cost standpoint.

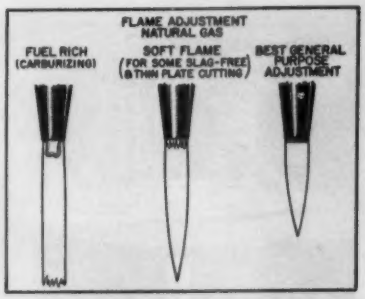

FLAME ADJUSTMENT
NATURAL GAS
FUEL RICH (CARBURIZING)
SOFT FLAME (FOR SOME SLAG-FREE & THIN PLATE CUTTING)
BEST GENERAL PURPOSE ADJUSTMENT

Fig. 5. Simplified chart for proper adjustment of natural gas cutting flame.

Natural gas can be cheaper to use than acetylene on machine-controlled flame cutting, even when using generated acetylene.

The cost of generated acetylene was based on the cost of carbide, labor and repairs, but the cost of the generating equipment and house were not considered. This would cost about $30,000 if a new installation had to be made.

We have recently installed a 90,000 cu ft Driox system for converting liquid oxygen into a gas. This system replaced our cascade system where the oxygen gas was stored under pressure. It now requires a half hour to fill the Driox receiver; the cascade system took 4 to 5 hours to refill.

There is little if any direct labor saving on flame cutting operations. A small saving will be recognized in slagging operations, and of course, some indirect savings because of reduced cylinder handling. The bulk of the savings are in the fuel gas cost itself. **End**

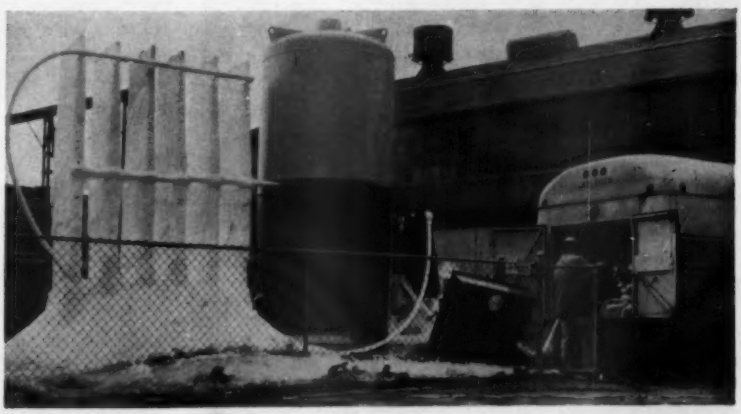
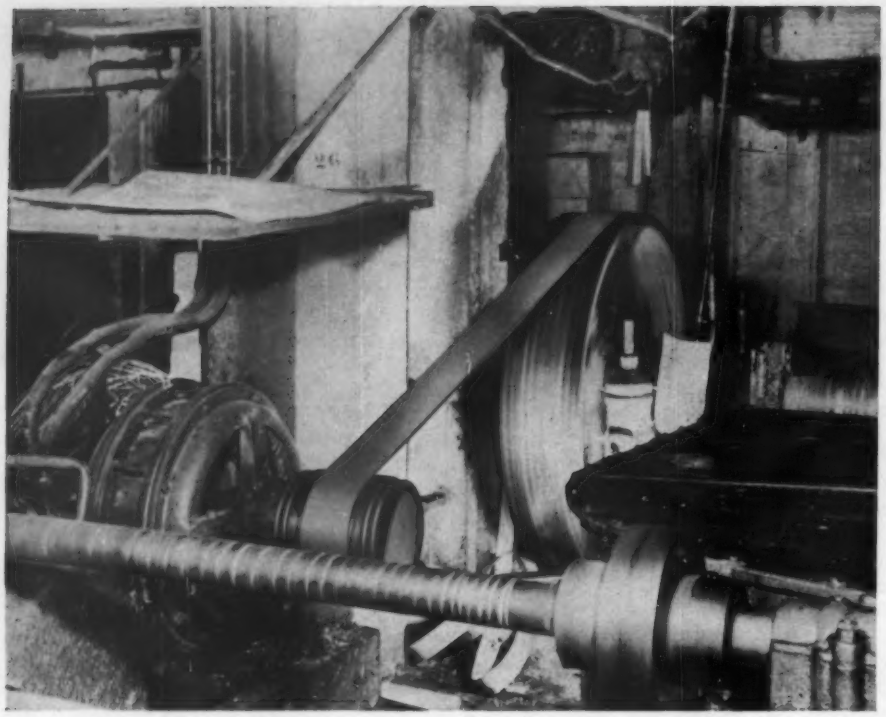


Fig. 6. Storage system (Driox) holds 90,000 cu ft of oxygen, fills in ½ hour.



This 8-in. plastic-leather flat belt is installed on a broke beater drive at Cornell Paper Products Co., Milwaukee. The formerly installed V-belts jumped the grooves and flew off the pulleys whenever the beater would jam.

CASE STUDIES: PLASTIC BELTS

Nylon and leather prove rugged team on tough power transmission jobs

SINCE THE INTRODUCTION of plastic belting about three years ago, many plant engineers have taken a wait-and-see attitude. Now there are sufficient installations to permit a fair evaluation of the uses and advantages of the all-synthetic belting, as well as the so-called "sandwich" belts—a nylon core between two strips of leather.

Load carrying member of the plastic-leather belt and the all-plastic belt are essentially the same—flat ribbons of extruded nylon. The flat nylon ribbons making up the core determine the capacity of the belt. They are "oriented," a process which locks the molecules in position and makes the bands almost 100 per cent elastic and free from stretch. The belts will lengthen under load, but when the load is removed, will return to their original length or tension. They will do this repeatedly without any appreciable loss in their driving efficiency.

All-Synthetic Belting

Performance characteristics of all-synthetic belting have been demonstrated in many applications.

On a high-speed grinder, woven endless belts which lasted three weeks were replaced with Texalon, an all-synthetic. The belt goes from the motor to the jack shaft, and from the jack shaft to the spindles. After nine weeks, it was still giving satisfactory performance, three times the service of the belt it replaced.

On a compressor, a similar 31 ft by 5 in. belt replaced a 10 in. wide double leather belt after an emergency breakdown. The new belt was made endless and installed with a minimum of shutdown.

A rewinder in a paper mill presented a tough drive application—extremely oily condition, spring-loaded tension, multiple pulley with a number of reverse bends. In five months, the Texalon belt has not elongated and has given completely satisfactory service.

All-synthetic belting is also being used in conveyor applications. A food processor uses the belting as conveyor tapes to pull waxed butter and ice cream cartons from the water cooling bath. The tapes run through water continuously, with no rotting and no problems with tension.

A can manufacturer uses synthetic tapes to convey lithographed lids to the bake oven. A chewing gum

manufacturer uses the synthetic tapes on product lines.

Carrier tapes for the printing industry represent another successful application of all-synthetic belting. At Rutherford Press, Rutherford, N. J., the life of synthetic carrier tapes is several times that of cotton tapes on Dexter folders. As a number of tapes are required on the machine, the reduction in downtime for replacing broken tapes is an important factor. It has also been found that cotton tapes stretch or shrink with changes in humidity, while the synthetic tapes hold the proper tension, and thus maintain the efficiency of the folding equipment.

Many plant engineers refer to all-synthetic belting as the "quick belt" because it can be made endless on the job in a matter of minutes. It is no longer necessary to keep a stock of various size belts on hand. Unlike the woven endless belt, which is custom-made to required lengths, all-synthetic belting is often purchased in rolls and made endless as required by the plant engineer's organization.

All-synthetic belting can be used on small pulleys, with high belt speeds and high pulley ratios. It works easily on both short and fixed center drives. It can operate continuously at a temperature range from 0 F to 212 F, and can temporarily withstand temperatures from —20 F to 300 F. It can be used under wet or dry conditions and will resist oils, greases, and gasoline.

Leather-Plastic Belting

One of the early users of leather-plastic belting was the paper industry, where cone pulleys are frequently used. Nylon core leather belts can be about one-third the width of conventional belts on cone drives. The narrower belt almost always solves both draw and speed regulation problems.

The leather-plastic belting properly installed runs true on the pulleys. The tension or load carrying members are the nylon ribbons. Since this nylon core is not only more uniform throughout its width but is also narrower, the effective line of pull stays within a very narrow range. Consequently, there is more uniform draw and less pressure against the shifters.

Among new paper machine installations that use leather-plastic belting are the No. 4 machine at Chillicothe Paper Co., Chillicothe, Ohio, a Fourdrinier machine at Angel Soft Tissue Mills, Thomson, N. Y., and an experimental machine at Western Michigan University, Kalamazoo, Michigan.

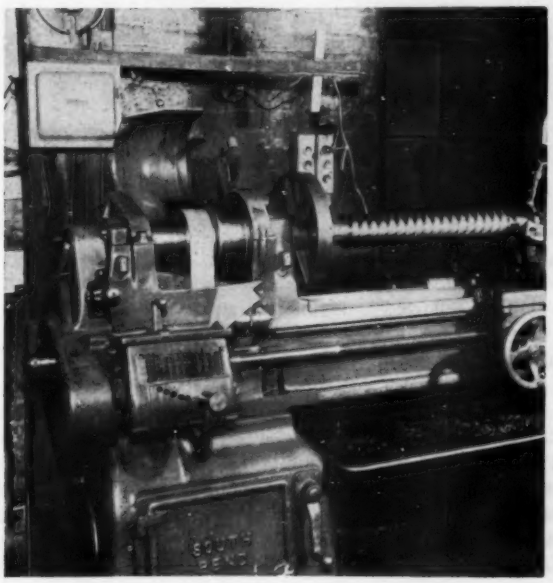
At a large eastern paper company, leather-plastic belting is used on the drive of a 168-inch trim rewinder, and on the drive for the wet end of a 168-inch trim paper machine. The new belting, on ductile iron pulleys, has made it possible to increase taper cone pulley drive speed by 50 per cent. The belt can be operated at 9000 fpm compared with operating speed of 6000 fpm of former belt.

It has been found that leather-plastic flat belts can be used to good advantage in the 25 to 1000-hp range, where flat face pulleys are cheaper than V-groove sheaves.

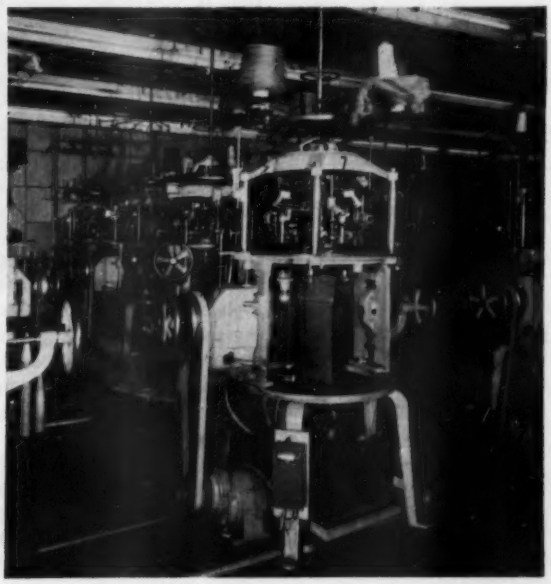
Leather-plastic belts can be made endless on the job, but it takes considerably more skill and more time than with all-synthetic belting.

Leather-plastic belts are made with a leather surface on both sides of the nylon core, or at a lower price with leather on the pulley side only and fabric on the other. Leather on both sides permits using the belt on both sides, or on serpentine drives. Both are well suited for multiple pulley drives, high pulley ratios, shortcenters, crossed, and cone drives. Machine oil and moisture have little effect on them. They can operate in temperature ranges from —20 F to 160 F. **End**

This all-plastic belt is in use on a 10-in. lathe at American Cam Co., Philadelphia. Belt can be made endless in 15 minutes using beveler and press supplied by manufacturer.



Wexler Knitting Mills, Philadelphia, uses all-synthetic belting on Jacquard and Leighton knitting machinery drives. Belting is subject to high humidity but maintains tension.



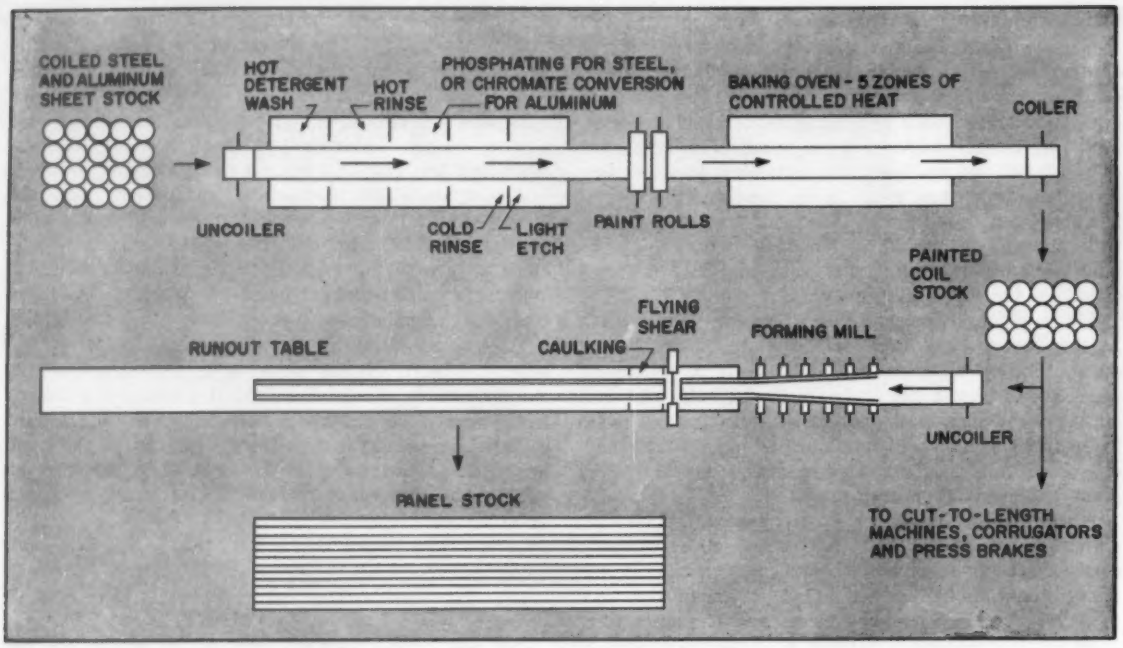


Fig. 1. Flow diagram of metal strip painting and forming production lines. Paint line also supplies coils to the machines, corrugators and press brakes (not shown) for production of colored corrugated and V-beam roofing and siding.

SMITH PAINTS METAL FIRST— THEN FORMS IT!

Surface preparation plus new paint vehicles enable this company to reverse usual fabrication procedure

BECAUSE OF THE increasing trend to more pleasing architectural design of industrial buildings and the new preference for colored wall panels and curtain wall construction, a Pittsburgh manufacturer has installed the industry's first continuous paint line for coiled sheet steel and aluminum, completing the first phase of an expansion program still under way.

Elwin G. Smith & Company, manufacturers of metal siding and roofing, insulated wall panels and curtain walls, are reversing the conventional procedure of first forming, then painting metal wall panels.

Through the use of newly developed metal surface preparation and the availability of paint using new vehicles that retain enough elasticity to withstand the stresses of metal forming, they are painting coiled strips before forming. Production economies are being obtained by this method which will be reflected in lower material costs in building construction and at the same time, it is said, provide panels of greater color stability.

In addition, it has the advantage of a surface already conditioned for subsequent painting without priming or other preparation.

The new continuous paint line for coiled sheet washes, treats both surfaces, applies paint by roller coating, bakes the paint at 600 F and rewinds the sheet into coils, all in one continuous operation. A flow diagram of the production line is shown in Fig. 1. This equipment will handle aluminum and steel, in thicknesses up to 16 gage and in widths up to 48 in.

Stages of washing and treating, operating under high pressure sprays, are: hot detergent wash, hot rinse, hot phosphate or alodine for steel or aluminum respectively, cold rinse, hot chromic bath for light surface etching and finally drying by hot air blast.

Operation of the paint roller coat-

Fig. 2. This is one of the final products —an assembly of the panels to form an insulated curtain wall. Note that there is no cracking of the paint on inside bends and no folding on outside bends.

Fig. 3. This equipment automatically forms painted steel or aluminum strip into wall panels in various contour patterns and also cuts it into required lengths.

Fig. 4. Here the traveling strip is given a hot detergent wash and hot rinse, treated with spray of phosphate or alodine for steel or aluminum respectively.

ing machine is much like that of offset printing. Paint pours continuously onto a rubber roll which transfers it to the steel rolls. These in turn distribute it evenly onto the traveling metal strip. Thickness of the coating can be adjusted by roll pressure on the strip. Either side can be painted, or both sides of metal can be painted simultaneously.

Paint coater can supply paint film controlled in thicknesses from 0.0001 to 0.0025 in. The painted strip passes through an oven with five separately controlled heat zones, each adjustable to a maximum of 600 F. After the final heat zone, the strip is passed through a cold water rinse for cooling and is then rewound into coils.

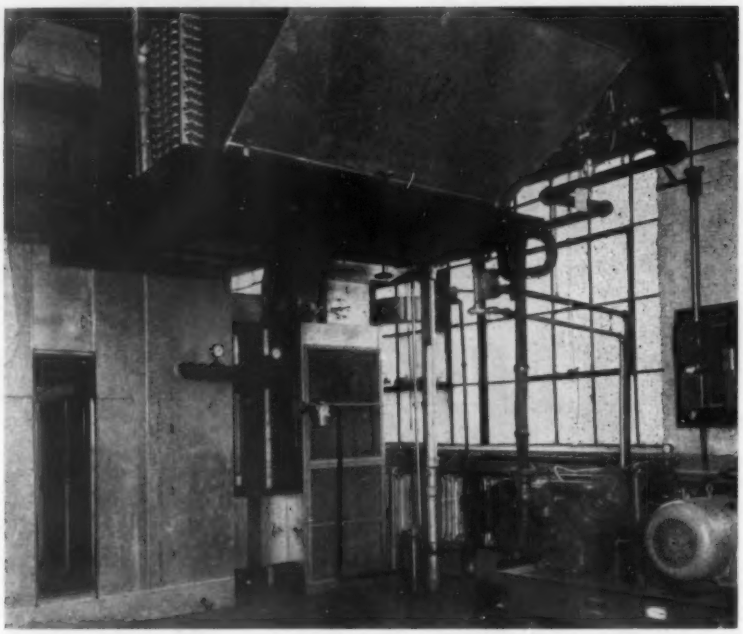
Speed of the strip is adjustable with the maximum of 68,000 sq ft of continuous coiled sheet painted both sides, per eight hour day.

Second unit in this production line is a continuous roll-forming machine which produces metal panels for curtain walls and metal roof deck in gages up to 16 for aluminum and 18 for galvanized, aluminized or stainless steel. The machine uncoils the strip, forms it into the desired panel in several stages, cuts the panels into required lengths and caulks the side joints all at a speed of 150 fpm. Maximum length of sheets manufactured is limited only by transport facilities, or 60 ft lengths, as a practical limit. This length, however, permits construction of a building 60 feet high, without horizontal laps or seams.

The machine handles uncoated steel or aluminum, painted steel or aluminum, galvanized or aluminized steel or embossed aluminum and stainless steel. Original mill finishes or color coating are not affected or marred during this operation. To protect against subsequent handling and shipping, the machine applies a pressure-sensitive paper strip, which is removed after installation. All this equipment is located in a new building. **End**

ODORS OUT!—FRESH AIR IN!

Vapors and odors are removed from the plant operations with help from specially-designed filters, containing activated charcoal



General view of the odor removal system which permits recirculation of as much air as possible to maintain constant humidity and temperature. Filter cells are at left.

IRRITATING VAPORS and odors presented quite a problem in a Chicago furniture specialty house. The vapors and odors were caused by the evaporation of volatile solvents used in a silk screening process for making clock faces and other decorative decals.

The complexity of the problem was increased since it was necessary to recirculate as much of the air as possible in order to maintain constant humidity and temperature (which, if allowed to vary, seriously affects silk screen registration). These vapors could not be vented to the outside because of the likelihood of neighborhood pollution problems. So, the odor concentration continued to increase.

Worker discomfort was acute and efficiency had become seriously low. Labor turnover was at its highest peak when key department personnel met and, with regret, expressed the desire to resign unless conditions were greatly improved.

A Chicago air conditioning company, Merchant's Equipment Company, was consulted. They, in turn, contacted Barnebey-Cheney of Columbus, Ohio, because of its experience with odor removal problems.

It was decided that activated charcoal was the solution because of its capacity for adsorption of volatile solvent vapors, as well as almost all other odor producing vapors. This ability is based on certain properties of the charcoal. Each granule contains millions of inter-connecting capillary passages, sub-microscopic in size. The relative size of these tiny passages makes it possible for activated charcoal to preferentially adsorb large molecules from air and other gas streams.

Barnebey-Cheney recommended the installation of eight stainless steel 7FS Filter-Folds, each containing 45 lb of coconut-shell activated char-

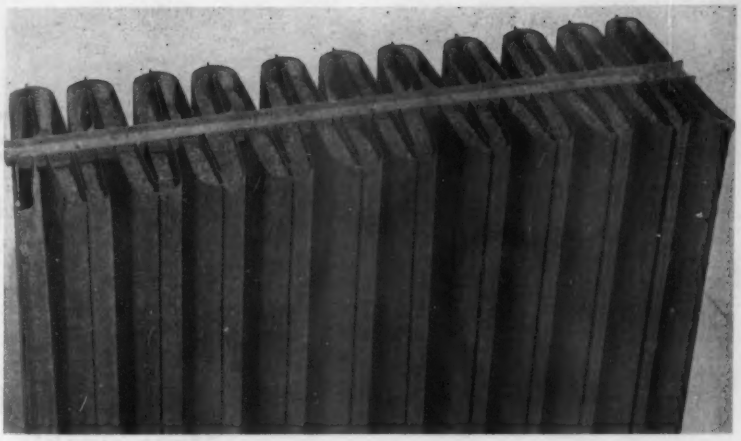
coal. Design called for 8000 cfm of air from the decal room to circulate through these air purification cells, then recirculate back into the same room. Use of this type system allows the same air to be used over and over again while the humidity and temperature remain constant.

By stripping the accumulated solvent vapors derived from gasoline, naphtha, turpentine, lacquer thinners, and synthetics used on vehicles in silk screen paints, the air is actually cleaner than outside air.

The filtering equipment was developed to overcome certain disadvantages of earlier activated charcoal filters. It is made up of folded cells, that allow large air handling capacity in a filter having a small face area. The pressure drop is low and as a result this filter is easy to work into new and existing ventilating systems.

The filters are easily assembled in large banks for high capacity installations. They are designed to use activated coconut-shell charcoal to the best advantage. The leading edges are round and perforated allowing complete odor removal over the entire face area and decreasing over-all resistance to air flow.

By using high activity coconut-shell charcoal in these cells, maximum efficiency is obtained. Activated charcoals are classified according to raw material, adsorptive capacity (activity), and mesh size.



One of the filters used in the system has been removed from the frame to show the folded construction and how the activated carbon is packed in the unit.

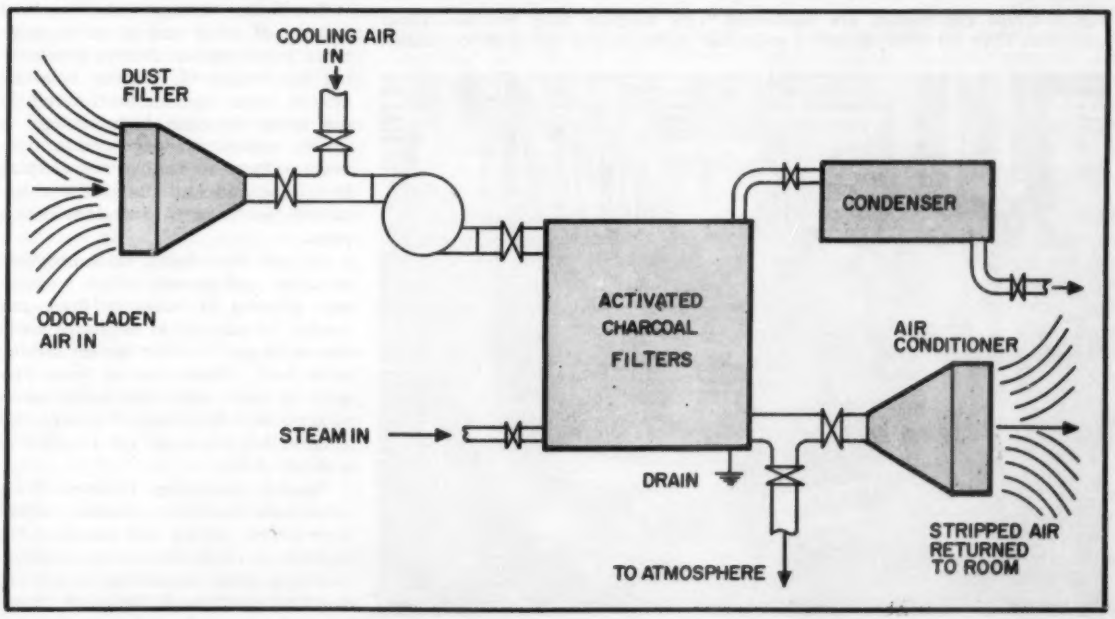
Most high grade adsorption charcoals are made from coconut shells for resultant hardness and high activity. Particle size is usually selected by keeping in mind the resistance to air flow, which should be kept to a minimum.

When the activated charcoal in the cells becomes saturated with solvent vapors it is restored or regenerated to its original capacity by removing the adsorbed vapors every other day, at the installation site. This regeneration is accomplished by supplying heat energy to the system in the form of saturated steam.

At this installation, the charcoal is completely changed every six months by returning the cells to Barnebey-Cheney. (Most installations do not have the high concentrations of solvent encountered on this job and can be restored to full efficiency by simply exchanging filters once every 6 to 18 months.)

This system, including new ducts, blower, air conditioning equipment and humidity control, has been in use since April 1957. Personnel problems have become nonexistent and production is at an all time high. **End**

Schematic drawing shows features of system which strips the irritating vapors used in the plant's silk screen process.



SCRAP HANDLING PROGRAMS— HOW TO PLAN THEM FOR PROFITS

Good scrap handling can mean:

- **Higher salvage prices**
- **More usable floor space**
- **Improved plant safety**

THERE ARE MANY WAYS to handle scrap. It can be done by 20 men with baskets or by one man with a push-button. The scrap can pile up underfoot or virtually store itself in bins. It can rust in the open air or be reused or sold.

There are four basic objectives to be achieved by a scrap handling system, according to Gifford-Wood Co. They are: 1. reduction of downtime; 2. reduction in man-hours; 3. fast removal of scrap from production areas; 4. better utilization of plant space.

Usually, all four of these objectives will be sought by a plant. Sometimes, however, just one of these objectives will provide the incentive to mechanize scrap handling.

The exact type of system used to accomplish these objectives depends upon a number of factors that differ widely from plant to plant. These are: 1. scrap volume; 2. machine tool arrangement; 3. special processing requirements; and 4. method of disposal. These factors must be carefully analyzed in order to obtain design data for the most efficient and economical scrap handling system.

Scrap volume. It is necessary to know how much scrap is produced by a plant and its relative value when handling costs are considered. To determine this, figure the amount of scrap produced on an average working day. Its value known, handling costs must then be estimated.

Figure the average cost of man-hours devoted to scrap handling during an average day and also include time spent by the machine operator in cleaning scrap from his machine. Add to this, lost production time while the machine is shut down for cleaning. Then estimate the cost per day for truck operation and for auxiliary equipment such as tote boxes, slings, etc. Total all these costs, compare this total with scrap salvage returns, and the cost of manual handling becomes apparent.

Machinery arrangement. The total amount of scrap and where it originates are important factors determining the design of a scrap handling system. Some machine tools may turn out scrap tonnages high enough to justify installation of separate conveyor systems to remove the scrap as it is produced and transfer it either to tote boxes or a central collecting point.

On the other hand, machines such as lathes and presses, which are usually grouped in banks or lines, can readily be adapted to discharge scrap into a single conveyor system serving each bank. Usual practice when several of these conveyors serve banks of tools is to have them discharge into a collecting conveyor for transfer to a disposal site.

Special processing features. It is sometimes desirable, especially where high-priced cutting oils are used, to include provision for coolant reclamation and scrap processing in a scrap handling system. If included, these

Fig. 1. Chips and coolant are discharged from machine tools into underfloor conveyor. They are then carried to collection conveyor, and delivered to crusher.

provisions should be an integral part of the original plan for the system.

Coolant reclamation is usually handled by collecting drained-off coolant in sumps underneath the conveyors. From here the coolant is piped to clarification and filtering units and then returned to the coolant supply system for reuse.

Processing of scrap for resale is another operation that can be efficiently handled in a mechanized scrap handling system. Usual equipment consists of a high-speed centrifuge for oil extraction, and crushing equipment to reduce the scrap to uniform size. Other features such as baling equipment can also be included.

Storage and disposal. Practically any salvage program can be made more efficient by using mechanical conveyors. Simple systems deliver to central collection points where the scrap is picked up and hauled away.

More complex systems convey the scrap directly to either large storage bins or to gondola cars or trucks. Selection of a disposal system depends on the amount and type of scrap to be handled and transportation facilities.

Scrap handling conveyors are available in three basic types suitable for either batch or continuous handling. These three types, hinged-pan, bucket elevator, and oscillating conveyor, can be adapted to solve any scrap handling problem, whether movement of scrap is horizontal, vertical, or inclined. Of the three, the hinged-pan conveyor is most commonly employed.

Hinged-pan conveyor. The hinged-pan conveyor is especially suited for scrap handling because the multiple closely-fitted pan joints leave no opening during movement for sharp-edged scrap to become wedged in. The side flanges prevent scrap from spilling over in transit.

Another important feature, from a maintenance view, is that all mechanical wear during normal operation is restricted to two easily replaceable parts. These are a roller and bushing on each hinge pan. They encounter friction as they follow the chain track, and, if worn excessively, are easily replaced by means of a press-fit cotter pin.

Bucket elevator. These units are designed to accomplish vertical or steeply-inclined movement of scrap. They are rarely used to receive scrap directly from machines, their most usual application being the elevation of scrap from collecting conveyors to storage bins or for inter-floor transfer of scrap loads.

Scrap is picked up in a chute at the bottom of the elevator, carried upward in a continuous line of buckets, and discharged over the top of the elevator into bins or hoppers.

Fig. 2. Hinged-pan conveyors serve punch presses, then deposit chips on elevating conveyor. Removable metal floor plates permit easy access to any conveyor.

Oscillating conveyor. These conveyors perform the same general function as hinged-pan conveyors, i.e., the movement of scrap horizontally, but they function on a different operating principle. They are vibrating-trough conveyors and material is moved by using the regenerative force of integral return springs to assist the motor in supplying an upward and forward movement to the material.

Since construction of this type of unit is much simpler, with fewer moving parts, and packaged assembly, installation time is much less than with continuous chain conveyors. Oscillating conveyors are supplied in standard lengths of 10 ft with 5-ft drive assemblies. For outdoor installations, protective covers can be supplied.

Storage bins. An important element of a complete scrap handling system is adequate storage facilities for accumulated scrap. These large storage bins are usually located adjacent to railroad sidings and include provisions for truck loading.

Scrap can be delivered by bucket elevator to the bins where it is stored. Wet iron scrap may be stored for up to two and one-half days, following which it should be removed or rust will make it impossible to move. Dry scrap can be stored much longer.

Discharge is through movable chutes. A chute is provided for each of three compartments of the bin. In this way, three types of metal scrap may be stored in bulk and disposed of when desired.

Study Plant, Operations

The problems of mechanizing a plant's scrap handling program are solved only by thorough study of the plant and its operations. In every case, factors such as plant layout, machinery arrangement, type, size and quantity of scrap will determine the eventual selection of conveying equipment.

Each conveying system is a unique installation, and must be designed and engineered to handle scrap as efficiently as possible according to the conditions prevailing in each individual plant. Therefore, each plant may derive its major benefit from one specific objective, as shown in the following cases.

Reduction of downtime. At General Electric's Large Steam Turbine-Generator department plant in Schenectady, N. Y., removing loaded chip boxes from beneath large machine tools usually meant a minimum of 30 minutes lost production time several times daily.

However, on three new 60-in.

grooving lathes, automatic conveying systems remove the chips as fast as they fall and carry them from underneath the lathes to conveniently-located tote boxes.

The lathes are equipped with individual conveyor systems consisting of a horizontal hinged-pan conveyor section and inclined hinged-pan conveyor section. The horizontal section is located directly underneath the lathe bed along its length, extending from the head stock to beyond the tail stock where it empties into the inclined section.

Chips fall through the bed, are deflected by skirts onto the horizontal section, are carried to the inclined section and then elevated to a chute located over two tote boxes. These two tote boxes are filled alternately by means of the chute which is bifurcated, thus permitting one to be removed while the other is being loaded.

Some additional handling is required here for disposal, but only a fraction of that required before, when it was necessary to call in an overhead crane to lift off a metal plate covering a tote box sunk in the floor under the lathe. This box would then be removed, another replaced, and the plate returned. This happened two or three times daily, tieing up production at the machine, causing unusually heavy crane movement, and complicating strict safety procedures in the plant.

Reduction of man-hours. Eight hundred work-hours per day were saved when the U. S. Hoffman Machinery Corporation installed an automatic underfloor conveying system in its new Auburn, N. Y. plant. All phases of scrap handling were mechanized to eliminate manual handling and the system includes conveyors, coolant reclaiming units, chip crushers, a pneumatic chip conveyor and storage bins.

Coolant Salvaged, Too

Here 40 machine tools are arranged so that chips and coolant discharge into underfloor hinged-pan feeder conveyors, Fig. 1. The conveyors carry the chips to a main collecting conveyor delivering to a chip crusher. After crushing, the chips are blown through the pneumatic system to storage bins for eventual loading of gondola cars.

There are three feeder conveyors, each picking up scrap from one aisle of tools. The main collecting conveyor is also a hinged-pan type and is arranged perpendicularly to the feeder conveyors.

Another feature of this system is that provision is made for the salvage, reconditioning and reuse of coolant. Coolant collects in troughs beneath the conveyors and is piped to a flotation unit which reconditions it and returns it to the coolant supply tank. Reconditioning includes settling out of the heavier material in a collecting unit, then foaming out the fines in a special compartment. This foaming action induces aeration of the coolant, thus prolonging useful life before it becomes rancid.

Fast removal of scrap from production areas. Five tons of scrap per hour are quickly removed from a number of different machines at widely-separted locations in a large midwestern plant where an automatic underfloor conveying system was installed. Scrap collecting at these locations is transferred by a main collecting conveyor out of the plant and to a storage bin. The system consists of seven oscillating conveyors and a continuous bucket elevator.

The oscillating conveyors are located in trenches beneath the floor and receive scrap, via chutes, from many types of machine tools. This scrap is automatically transferred throughout the system, out of the building, and, finally, to the disposal site.

The conveyors are arranged to service most of the machine tool aisles in the plant; thus, each conveyor varies in dimensions and capacity according to each tool aisle. Five of these oscillating conveyors are feeder conveyors, receiving scrap from the machines, and one of these five is also a main collecting conveyor, (77 ft long), for transferring scrap out of the plant.

At the end of this conveyor, a short transfer conveyor picks up the scrap and deposits it on an inclined oscillating conveyor which delivers to a hopper of the continuous bucket elevator. From here the scrap is elevated to a 16-ton storage bin to await gondola car loading.

One of the most interesting features of this system is that it was designed to accommodate a wide range of scrap loads at many points in the system. For example, at one point, only 250 lb per hour is fed in, while at another point five times as much scrap is loaded in an hour.

Better utilization of plant space. Fifteen per cent more plant space became available for production equipment when General Electric Co. installed an automatic scrap conveying system in a new plant in Appliance Park, Louisville. The conveying system eliminated the need for tote bins and fork lift trucks; therefore, the space usually needed for access lanes and placement of bins was released, and the production equipment arranged more compactly.

The new system operates below the floor level in trenches covered by metal plates. Each of the 54 punch presses here has a chute descending through an opening in the metal plate covering one of seven underfloor feeder conveyors.

The scrap falls onto these continually-operating conveyors and is carried to a main collecting conveyor, running at right angles to the seven side-by-side feeder conveyors. This main conveyor collects all of the scrap from the feeder conveyors and deposits it on a transfer conveyor, running at right angles, which leads out of the plant, Figs. 2 and 3.

Fig. 3. Transfer point where scrap is deposited from main collector conveyor.

Outside the plant, in a transfer well, this conveyor deposits its load on an inclined hinged-pan elevating conveyor. Scrap ascends this conveyor, and at the top, falls through a chute into the gondola car.

The system operates continually as long as scrap is being removed and has a rated capacity of six tons per hour. To prevent accidental overload damage, a specially-designed protective electrical interlock circuit shuts off power to preceding conveyors when a conveyor is halted for any reason. **End**

Fig. 1. Decentralized layout spreads buildings along production lines. Dark "slots" in roofs are translucent panels.

SIMILAR PRODUCT, SIMILAR BUILDINGS

But Mobile Home Builders Choose Different Layouts

TWO manufacturers of mobile homes had these additional features in common: both were originally located in Michigan; both decided to build a plant in Georgia; and both used steel buildings for their plant.

However, the similarity ends—one company built decentralized structures with one type of steel building, while the second built a single structure with a different type of steel building.

The Marlette Coach Co., building in Americus, Ga., erected several Armco steel buildings, totaling 65,000 sq ft, designed on the basis of decentralization. They selected this layout with an eye toward future expansion. The buildings are: primary assembly building, 40 by 59 ft; paint building, 40 by 120 ft; final assembly building, 70 by 160 ft; main manufacturing building, a triple-unit structure 140 ft wide by 200 ft long; an intermediate building, 50 ft by 220 ft, joined at right angles to the main manufacturing building. Eave heights are all 14 ft.

The new plant of the American Coach Co., in Milledgeville, Ga., is a multiple Armco steel building, encompassing 56,400 sq ft. Dimensionally, this plant consists of three 60-ft-wide units, averaging about 290 ft in length. A 102-ft-long lean-to was added to one of the sidewalls. Eave height is 14 ft, exterior walls are Steelox panels, roof is corrugated steel. **End**

Fig. 2. Fabrication of mobile homes at this plant is done in single multiple-unit building, in contrast to separated buildings.

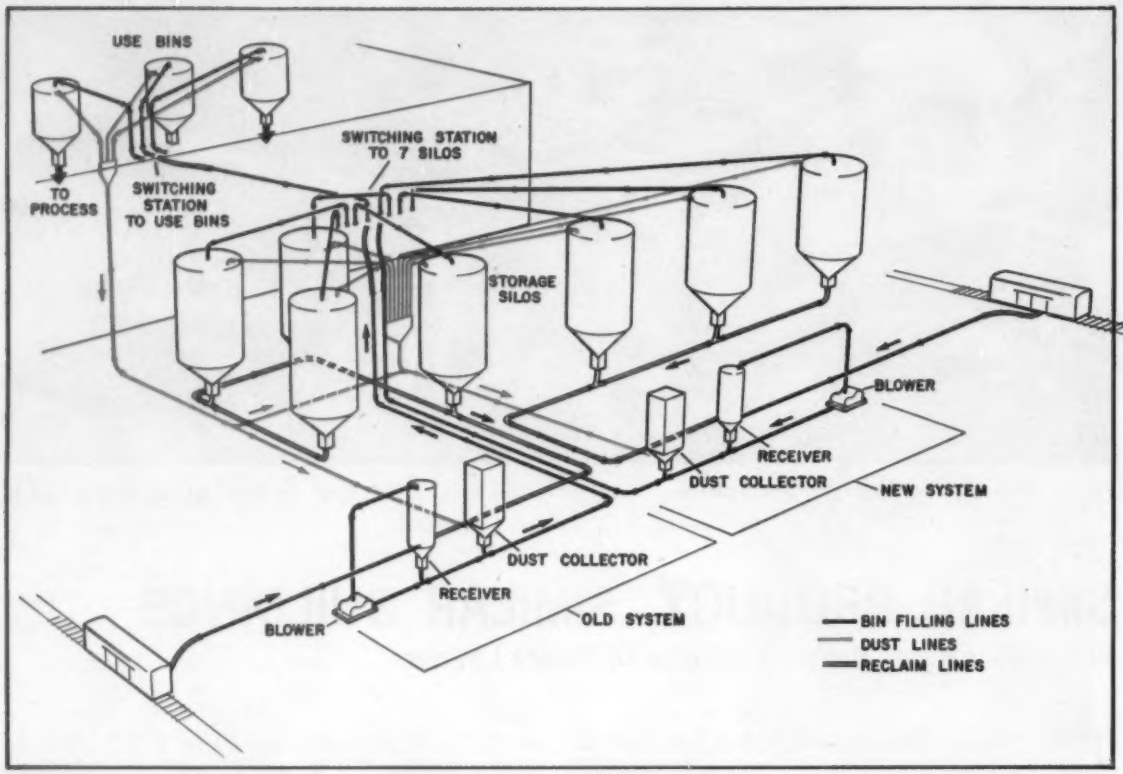


Fig. 1. Schematic diagram of the entire air handling system installed at Merck. Note switching station for seven silos.

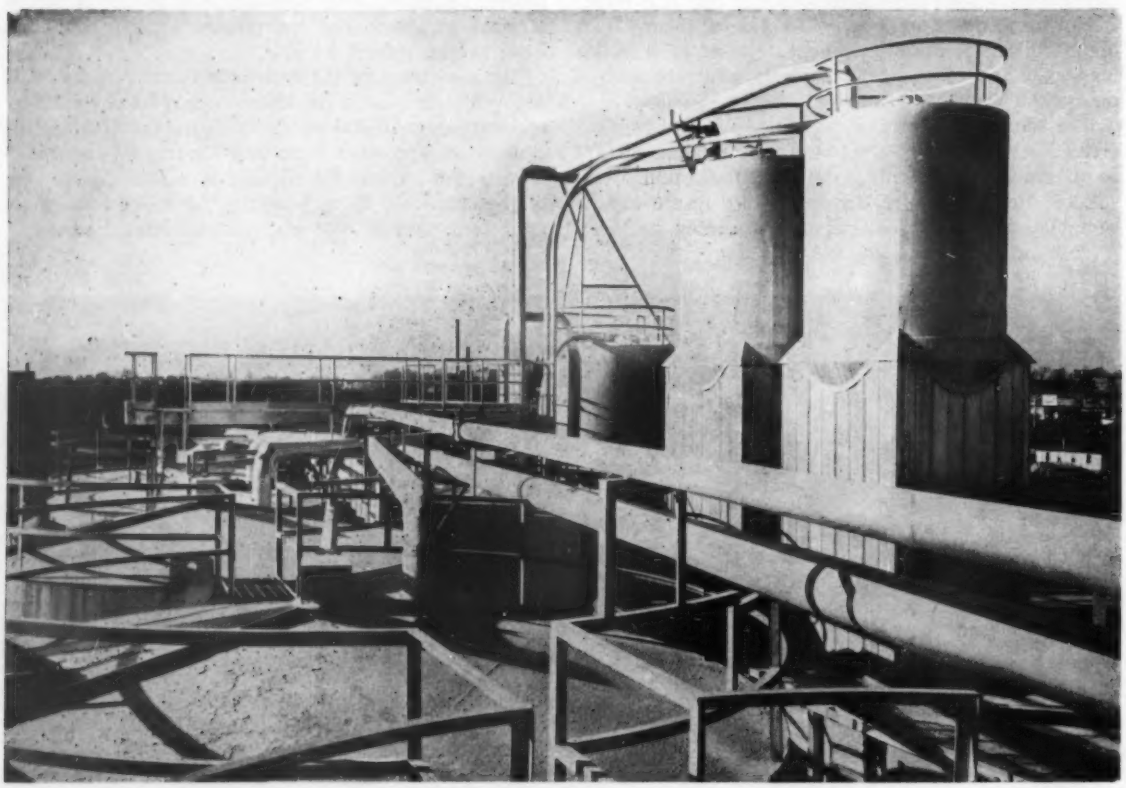
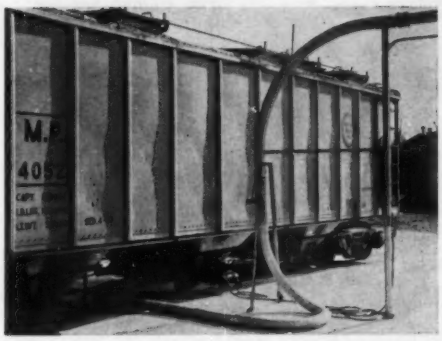


Fig. 2. Dust lines (shown above in color) from storage bins and process bins return conveying air to dust collectors.

EXPANDING HANDLING—

Here's how Merck & Co. cut demurrage charges, speeded loading and unloading by extending existing air handling facilities



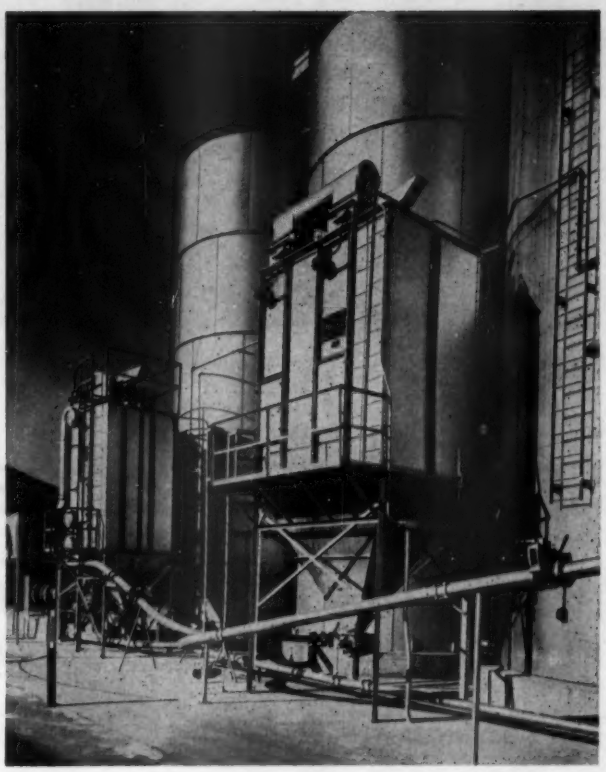


Fig. 3. Above: Car unloading is simple, fast and dust-free. Fig. 4. Right: Bag-type dust collectors, integrated with conveying systems, discharge material collected from bin filling operations directly into main conveying lines for return to process or storage.

PLANTS FACED WITH increased bulk handling requirements—current or anticipated—can easily expand existing air conveying facilities. This was demonstrated recently at the St. Louis feed supplement plant of Merck & Co., Inc., where a new system was integrated with an older installation to raise capacity for handling grains and crushed oyster shells.

Primary reason for supplementing its present bulk handling system, according to Merck's F. E. Bergin, was increased demurrage charges occasioned by the inability of the unloading equipment to keep pace with higher production schedules. "What's more," commented Mr. Bergin, "while we have experienced no spoilage resulting from delays in unloading, it is always possible that infestation can occur when grain is confined in hopper cars in the heat of summer weather."

Merck's choice of a ground level pneumatic conveyor as the original bulk handling method eliminated many expansion problems. With air conveying, new storage silos could be located in the most desirable position without regard to proximity of railroad sidings. New conveying lines could be coupled with old for systems integration.

When the plant's bulk handling requirements increased, new silos were built in line with existing facilities. Working with engineers from Dracco Division of Fuller Co., Merck installed an additional conveyor system to handle the load. Use of duplicate components in the new system minimized engineering costs. This feature, incidentally, also simplifies maintenance and permits minimum parts inventory. Ground level location cut installation cost and eliminated expensive supporting structures.

Switching stations, equipped with flexible hoses, enable each system to perform a variety of handling operations. These serve as cross-overs between systems, providing highly flexible handling with these possibilities:

1. Unloading box or hopper cars from either of two railroad sidings with either system.
2. Unloading from two railroad sidings simultaneously.
3. Filling any storage silo with either system.
4. Reclaiming from any silo to any process bin with either system.
5. Unloading and reclaiming simultaneously.

In addition, interchangeability of these functions assures uninterrupted operation in case one system is shut down for any reason. **End**

Fig. 1. Carpeting over the library flooring is vacuumed periodically by a sanitor who has been trained for his working assignments.

SPOTLESS FACILITIES—PRONTO!

That's just one bonus Quaker Oats gets from trained corps of sanitors

By F. J. SCHNEIDER, Plant Engineer, John Stuart Research Labs, Quaker Oats Co., Barrington, Ill.

AT THE RESEARCH laboratories of The Quaker Oats Company, sanitation is an important service function and is given wholehearted support. Cleanliness is a first requisite coupled with concern for the health, welfare, morale, comfort and safety of our employees.

The area of our building is 88,000 sq ft and is divided into three sections. The main or front building has two pilot plant wings extending back from it. The main laboratory building is air conditioned, the shops, stores, boilerroom and chemical pilot plants have mechanical ventilation. The chemical pilot plant has provisions for fourteen changes of air per hour for the purpose of purging any fumes that might otherwise accumulate. All the air is filtered, thus decreasing the dust accumulation.

Sanitation section is a part of the Plant Engineering Division and the sanitation foreman reports to the Plant Engineer. The total staff is five, one foreman and four sanitors. The foreman and three sanitors work on the afternoon shift when most of the cleaning operations are performed; one man is employed on the day shift.

All sanitors are trained on the job; overall, this has been a successful program, but some thought is being given to the possibility of having any new future personnel take training with a consulting firm at their training center.

After our move into the new laboratories in 1956 we followed high standards of cleanliness. Each of the three sanitors on the afternoon shift who is responsible for the main laboratories section, offices, library (See Fig. 1), cafeteria and washrooms was assigned 11,000 to 12,000 sq ft. After several months, in order to maintain the standards, we used overtime. It was obvious that the high standards set could not be maintained without additional help unless our personnel was given training in techniques of eliminating lost motion, of using tools and cleaning methods more efficiently.

We contacted a sanitation consulting firm in Louisville and employed one of their consultants to work and train our sanitors on the job. The training period consisted of six days and proved to be very successful as we were able to maintain our standards without any additions to our staff.

The consultant also advised us on types of equipment. We have utility carts for each sanitor for carrying standardized equipment to eliminate making return trips to the closets located on each floor.

A sanitor on the afternoon shift begins his work by taking his utility

cart completely equipped with cleaning soaps, mop, dust cloths, broom, etc. In each room he picks up papers, dusts desks, cabinets, window sills, etc. With a treated swivel-handled mop, size 30 in. by 8 in., he cleans the vinyl tile floors. This method of dry mopping is used in all the laboratories, corridors and cafeteria.

The washrooms are then cleaned, floors wet mopped, wash bowls and toilets washed with disinfecting soap and mirrors polished. The soiled vinyl tile in the laboratories that will not clean with the dry dust mops is spot wet-mopped.

The last hour is assigned to project work consisting of buffing floors on the average of twice a week; cleaning venetian blinds; dusting light fixtures; washing desk tops, glass in doors, cabinets and interior partitions.

Fluorescent light fixtures are completely washed once a year; also the one scheduled washing is coordinated with the group replacement of the fluorescent lights.

Washing of all outside windows is done by a contractor. All glass of the lobby and cafeteria is also washed by our personnel between the contractor's schedule as required.

All materials and supplies are kept at a separate central stockroom instead of in the general storeroom. (See Fig. 3.) In addition to this separate stockroom we have one to two sanitors' closets on each floor. All requisitions for supplies are issued by the sanitation foreman. This gives us a simple bookkeeping system for knowing the annual cost of materials and supplies.

Fig. 2. Sanitors work to high sanitation standards in modern research building.

The daily routine of the one sanitor on the day shift during the first six hours includes sweeping concrete floors in the cereal and chemical pilot plant areas, dusting window sills, telephones, railings, emptying waste cans, burning of waste in incinerator, spot cleaning of washrooms after the noon hour, cleaning up accidental spills, washing lobby and cafeteria windows as required. The last two hours are used for cleaning the dining and kitchen area of the cafeteria.

Fig. 3. Small room is used for central storage of sanitor supplies and equipment.

During the first year and a half we stripped and rewaxed the vinyl tile floors each six months. We have an area on test for longer periods and will strive to reduce the stripping and rewaxing to once a year. We also make tests of different manufacturers waxes. Now we are using the synthetic wax products.

At present we are maintaining 74,866 sq ft of floor area out of the total of 88,000 sq ft. The remaining 13,134 sq ft is maintained by section personnel. Our total cost of the sanitation program for the year 1957 was $23,000.00. I feel it would be misleading to give a cost per sq ft per year based on just the total area. The daily routine of the three sanitors working the afternoon shift in the main laboratory building is far different from the work in the pilot plants where the work is mainly on a weekly routine during the first six hours of the daily schedule.

(Continued on page 178)

His customer needed cable fast—to cover a breakdown. It took a weekend of teamwork to handle the

Emergency at 5:05!

Friday, 5:05 P.M. The call caught me just as I was leaving the office. One of my customers* in Seattle was in trouble.

I'm Tony Mitrovich—District Sales Manager for Rome Cable in Seattle.

A big piece of equipment had broken down and my customer needed 500 feet of 5-KV cable *fast!* I wasted no time getting Long Distance. The answer lay some 2500 miles away—in Rome, N. Y.

Friday, 8:15 P.M. Rome time. I had the Sales Service Manager at Rome on the line. I caught him at home. As I got the story later, my request triggered a chain reaction of events. Here's how they went.

Friday, 8:30 P.M. The Sales Service Manager at Rome tried to contact the Head of the Shipping Department. No luck. He tried the Traffic Manager at home. He was out bowling in the Friday night league. Only one thing to do . . .

Friday, 9:30 P.M. He located his man at the bowling center; both went back to the plant that same night, located the right cable in stock and got it out.

Friday, 11:00 P.M. Order completed!

Saturday morning, 7:30 A.M. 500 feet of cable was taken to the airport, where it was shipped by air to Seattle.

Monday morning, 7:30 A.M. in Seattle. The necessary cable was on the job.

That's teamwork. That's the kind of support that makes my job a pleasure—and makes lots of friends for me.

And that's the kind of service that helps lots of my customers out of jams—makes them loyal Rome Cable customers.

**Name furnished on request*

MEET THE MAN

WHO'S DEDICATED TO YOUR JOB

YOUR ROME CABLE SALESMAN

This story typifies the service you can rely on from your Rome Cable salesman. He links you directly and quickly with the facilities and engineering skills at Rome—not only during emergencies but also during any special demands of your job. When you have a wire and cable problem of any kind, give him a call.

ROME CABLE

For more facts circle 568 on Reply Card

THIS PIPE INSULATION HAD TO BE WATERPROOF

Water table just below surface was one deciding factor in selection of piping insulation

TULANE UNIVERSITY will soon start up its school-wide air conditioning system designed to serve all present and future buildings on the campus at New Orleans, Louisiana.

In designing the system, the consulting engineers, Leo S. Weil & Walter B. Moses of New Orleans, had to first make a decision on whether to use individual building systems or a central plant supplying chilled water to existing buildings, as well as future ones as they go into service.

The deciding factor was the high labor cost involved in individual systems. According to Mr. Weil, "The labor costs of operating and maintaining individual building units were so high that a central system connecting the buildings with pipes was the logical answer. It was estimated that a central air conditioning system will eventually save the university some $60,000 a year in labor costs, as compared to the manpower that would be needed to operate and maintain equipment in each building in the ultimate program."

The initial air conditioning program will include 15 buildings, all served from one central plant.

For esthetic reasons it was decided the pipes should be underground, out of sight. This caused another problem. In addition to the usual underground piping problems, Tulane's were even more acute since the water table is often only a few inches from the surface. In fact, the pipe had to be anchored in place at some spots to prevent the moisture from floating the lines right up out of the ground.

An insulation was needed that not only would be impervious to moisture, but would have the rigidity and strength needed to support the overburden of two-to-seven-feet of earth, and also be unaffected by soil chemicals. One material that met these specifications for the chilled water lines was Foamglas insulation.

According to insulation contractor George C. Gabler of Gabler Insulations, New Orleans, the sloping ground of the job location created a water table that varied from 5 ft below the surface to only a few inches. The pipe was fastened to concrete anchors. The anchors had channel iron embedded in them and the pipe was welded to this. This entire assembly was then surrounded by a Foamglas box to prevent sweating and heat gain.

The anchors also prevent drifting of the line due to expansion or contraction. Where the line changed direction, concrete pads, properly designed to take the thrust, acted as supports under the pipe.

Most of the insulation was installed on the pipe above ground with a mastic material. The insulation was then covered with two layers of glass fiber mesh embedded in mastic. Three-inch flaps were left free to permit final sealing. The pipe was lowered into the trench, using straps on A-frames. Twelve inches on each end of the pipe were left uncovered to allow welding in the trench. After welding, the bare pipe was wrapped with Tapecoat. The welded joints were then insulated and the flaps of the outer covering sealed. **End**

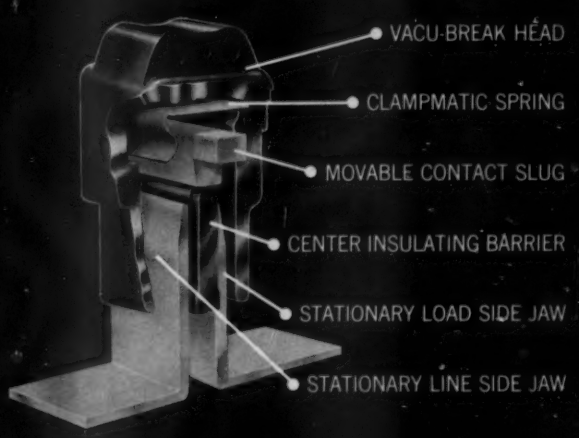
View of insulated pipe being lowered into trench with A-frames. Pipe is welded.

FOR SAFETY'S SAKE BUY VACU-BREAK

There's a big difference in safety switches—a difference between maximum safety and halfway safety—low maintenance and excessive maintenance. These differences are readily apparent when you look at the design and operation of the BullDog Vacu-Break Clampmatic* Safety Switch.

THE VACU-BREAK: Contacts are housed inside compact arc chambers which have very little air space. When contacts are "broken" under load, arcs can't build up because of the lack of oxygen. Pitting and burning of the contacts are reduced to the absolute minimum. Maintenance is virtually eliminated.

POSITIVE SWITCHING: For positive safety, the Vacu-Break switching mechanism does not rely on tricky toggles or springs to trigger the disconnect operation. The operating handle is directly connected to the contact heads by means of a sturdy *metal* rod. Push the handle "OFF" and the switch *is off!*



Vacu-Break heads are connected directly to the switch handle. No toggles or triggers . . . no tricky springs. No danger of switching failure, either. One of several exclusive BullDog Vacu-Break features that set the performance standards for the industry.

Close-up of Vacu-Break head shows movable contact slug inside the compact, oxygen-limiting arc chamber. Clampmatic spring assembly assures bolt-tight contact, speeds "break". This combination guarantees positive, safe operation, long switch life.

WITHSTAND 100,000 AMP FAULT CURRENT: Vacu-Break Clampmatic switches equipped with current-limiting type Amp-Traps** were subjected to 100,000 amp short circuit current. *The switches were undamaged.*

Play it safe! Compare, recommend, *buy* . . . BullDog Vacu-Break Clampmatic Safety Switches. They cost no more than other switches . . . yet give you the maximum in safety and performance.

**Vacu-Break and Clampmatic are registered trademarks of the I-T-E Circuit Breaker Company.*
***Amp-Trap is a registered trademark of the Chase-Shawmut Company.*

BULLDOG ELECTRIC PRODUCTS DIVISION
I-T-E CIRCUIT BREAKER COMPANY
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For more facts circle 569 on Reply Card

Fifty-three AIPE members and guests attended first Officer Installation Banquet of the Institute, June 9 in New York.

AIPE INSTALLS OFFICERS

Institute Holds Inaugural Banquet in New York City

WITH THE New York City chapter acting as host, chapter president James C. McClymont presiding at the speakers' table, the American Institute of Plant Engineers held their first Officer Installation Banquet on June 9, at the Statler Hilton hotel in New York City. William C. Wallin, Plant Engineering Department, Western Electric Co., Winston-Salem, N. C., assumed the presidency of AIPE from Sig A. Simonson, Plant Engineer, Chicago Hardware Foundry Co., North Chicago, Ill., who has held the post for eighteen months.

Installed with Mr. Wallin were: Vice President James M. Weeks, Proto Tool Co., Los Angeles; Treasurer Leo J. Monty, Artisan Metal Products Co., Waltham, Mass.; and Secretary Fred C. Fryberger, Food Machinery and Chemical Corp., Baltimore, Md.

Regional vice presidents of the Institute, also officially took office at the banquet. These men are: H. Smith, Diamond Alkali Corp., Newark, N. J.; A. J. Bossert, Cornell Aeronautical Laboratory, Buffalo, N. Y.; Walter Gruca, Standard Forgings Corp., East Chicago, Ind.; Oscar C. Moon, Bendix Aviation Corp., Kansas City, Mo.; Mehl Renner, Carling Brewing Co., Atlanta, Ga.; C. A. Gallaher, Robertshaw-Fulton Controls Co., Anaheim, Calif.; Fred Aston, Kraft Foods, Ltd., Montreal, Canada; R. C. Mounsey, United Shoe Machinery Co., Beverly, Mass.; and G. W. Austin, Gulf Atlantic Warehouse Co., Houston, Texas.

T. E. Hanson, Editor of PLANT ENGINEERING, continued an annual custom dating back to the first president of AIPE, in the presentation of an inscribed gavel to retiring president Simonson, as a tribute to his activity during his term as president. **End**

Retiring AIPE president Sig Simonson, left, accepts gavel presented by Editor Tom Hanson for Plant Engineering.

ADD-A-UNIT DESIGN CUTS INSTALLATION COSTS

Individual switch units, even whole sections, can be added or changed as requirements dictate.

Here's the easy, economical way to add new circuit capacity at a moment's notice. BullDog Unit-Versal Switchboards with their flexible design allow you to add Vacu-Break switch units, I-T-E Molded Case Breakers—even complete standard switchboard sections—quickly, safely and economically.

The compact, lightweight sections and switch units are especially designed to conserve valuable plant space. Each distribution section is a front accessible, self-contained board that can be operated alone or in combination with other sections. Individual units or sections can be added or relocated quickly with just a wrench or screwdriver.

Vacu-Break® switch units provide maximum safety, too. Arcs are smothered quickly inside compact Vacu-Break chambers. Pitting and burning of contacts are reduced to an absolute minimum — maintenance is virtually eliminated.

The Clampmatic® spring assembly inside the Vacu-Break chambers assures clamped-pressure contacts, speeds "break", increases switch life. For safety's sake, lower cost and speedier installation buy BullDog Vacu-Break Unit-Versal Switchboards.

BULLDOG ELECTRIC PRODUCTS DIVISION
I-T-E CIRCUIT BREAKER COMPANY
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New High in INDUSTRIAL HOSPITALITY:

Visitors' facilities at site of Niagara Power Project

HANDLING AND entertainment of guests is a problem for many industrial plants. Steel mills and food plants, for example, are meccas for many tourists and visiting engineers each year. Taking proper care of these visitors is the hallmark of a sophisticated company, one whose public relations department is wide awake to the corporate advantages inherent in the personal "public" touch.

One of the biggest and most dramatic of industrial tourist attractions this year will be the Niagara Power Project. Obviously, in the interest of safety and work continuity a mass influx of the general public could not be tolerated in such dangerous areas. In order to overcome this problem a Visitors' Facility was constructed, complete with television and contour map. The photos on this page show the salient features of the Facility. **End**

Above: Parabolic microwave receiving antenna outside the visitors' facilities building. Rather than subject visitors to dangerous construction conditions—and also to facilitate construction—they are shown work via television.

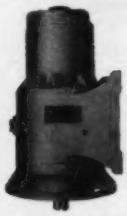
Above: One of most striking features of visitors' facilities is the large-scale relief model of the entire Niagara Falls area. Visitors enter this portion of facility first, to be oriented, then proceed to television room for views of actual construction work activity.

Right: One portion of television receiving room where visitors may watch construction operations and progress in complete safety. Tiered platforms permit an unobstructed view, even by those people standing in rear of room.

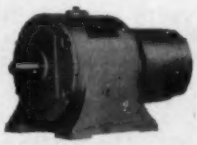
straightline speed reducer

all-motor horizontal gearmotor

all-motor right angle gearmotor



integral vertical gearmotor



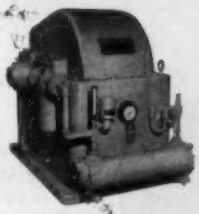
integral horizontal gearmotor

keep down-time down...

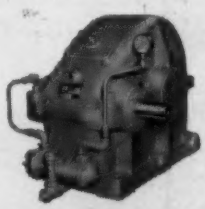
large right angle vertical speed reducer

large right angle horizontal speed reducer

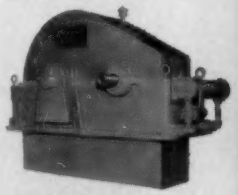
parallel shaft speed reducer



small high speed unit



medium speed unit



large high speed unit

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vertical speed reducer

Years of experience with user problems have been translated into superior designs that provide practical benefits. Greater reliability, increased production, lowest maintenance cost, no-cost engineering assistance ... all benefits save you time and money.

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- ☐ *High Speed Unit Bulletin 5904*

5907

For more facts circle 571 on Reply Card

Steel Bridge Truss Section Built Inside, then Disassembled for Shipment

LIKE A KING-SIZE erector set, the 182-ton riveted steel sections of a three-span cantilever bridge truss are being fully shop-assembled for drilling and reaming pin holes and to check out final dimensions before being dismantled and shipped to the construction site.

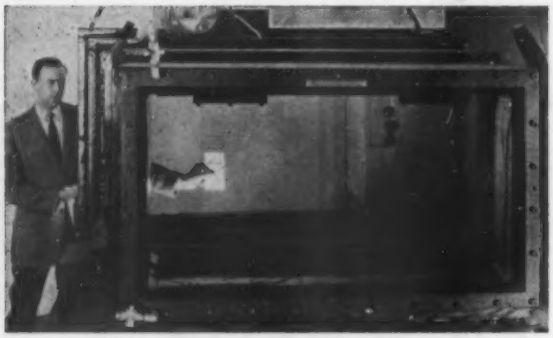
Eight such trusses are being fabricated by the Structural Steel Div. of the R. C. Mahon Co., Detroit, for highway bridges in Ohio.

Triangular measurements are employed by structural steel engineers to obtain perfect alignment of the sections, which measure about 93 ft at their widest point and are 714 ft long. Two of the sections are required on each side of two three-span bridges being built for the Ohio State Highway Dept.

Normally, the work is done outdoors, but the Mahon plant's bay sizes permitted the assembly indoors, where a 50-ton crane was available, and where accurate production methods could be employed in final drilling and reaming the holes to be used in field erection.

Each truss of the spans consists of steel box sections with access holes cut by automatic flame cutting. Trusses also are fitted with cast steel pedestals weighing four tons each. This operation requires drilling a hole to accommodate a seven-inch-diameter steel pin.

Nine Tons of Radiation Shielding Permit Viewing of "Hot" Operations



EIGHT AND ONE-HALF feet in depth, the thickest radiation shielding window ever built has been assembled by Corning Glass Works for the Atomic Energy Commission. The window weighs 18,000 lb and is one of the largest ever made by Corning. It contains seven separate glass panes, each nine inches thick, and 12 clear plastic sheets.

The AEC reported that the giant window will be installed in a new flight engine test facility at the National Reactor Testing Station near Idaho Falls, Idaho. At the site, the window will be used to protect persons observing activity in a radioactive "shop" with inside dimensions of 320 ft by 234 ft.

Tapering in size, the nine-ton window has over-all dimensions of 31 in. by 64 in. on the "hot" side and 22 in. by 42 in. on the viewing side.

Rotary Filters Separate Wax from Oil in Paraffin Wax Plant

CONSTRUCTION OF ONE of the world's largest MEK (methyl ethyl ketone) dewaxing-deoiling plants for the manufacture of paraffin waxes has just been completed by Badger Manufacturing Co. at the Philadelphia refinery of The Atlantic Refining Co.

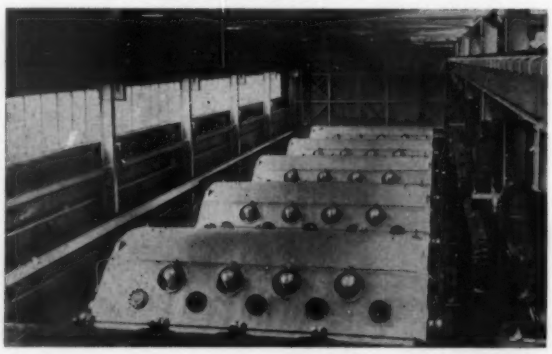
The plant has a rated capacity in excess of 216 million pounds per year of paraffin waxes of low oil content. Atlantic will market much of the product to manufacturers of wax-coated food packages.

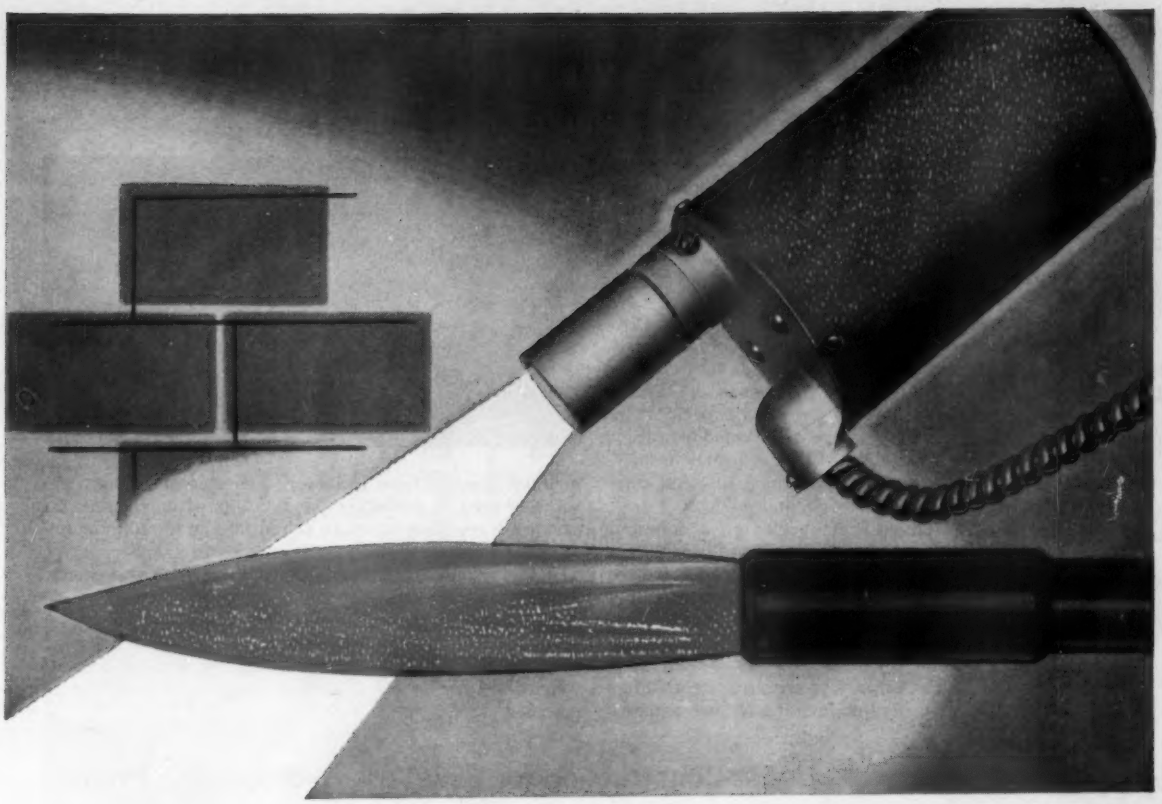
The 4.2-acre plant and its adjoining offsite storage, slabbing and packaging facilities cost approximately $18 million. The plant itself required less than 14 months to construct.

Heart of the process is the filter section where the wax and oil separation takes place. The specially-designed filters, with drums 11 ft in diameter and 20 ft long, are the largest in use in the petroleum industry.

The chilled wax slurry flows into each filter by gravity. As the drum rotates, dewaxed oil and solvent are pulled through the filter cloth by vacuum. The wax cake built up on the filter surface is washed by solvent sprays and blown free of the filter cloth. The cake is diluted and put through repulping and refractionating operations for further removal of oil and other undesirable components.

Prior to each stage of filtration the wax mix is chilled in a system of exchangers and chillers, which consists of a battery of double-pipe scraped surface exchangers and double-pipe scraped surface chillers arranged in two parallel banks with the drive ends facing each other. The refrigeration system consists of centrifugal compressors, propane condensers, propane receivers, economizers and knock-out drums.





New Honeywell Flame Detector

not fooled by hot refractory or glowing carbon...

The ultimate in both safety and convenience, *Ultra-Vision Flame Detector responds *only* to ultraviolet—not to infrared**

Here's the *only* visual flame detector that can tell the difference between real flame and red-hot refractory or glowing carbon. It responds to nothing but the ultraviolet energy given off by flame and sparks, and can't be fooled. It cuts off fuel delivery on flame failure alone, and completely eliminates nuisance shutdowns.

Use the new *Ultra-Vision* Flame Detector to supervise gas-fired, oil-fired or oil-gas burners—it detects a flame from any type of fuel. This one unit keeps an eye on both the pilot and main flame. Use it with any standard rectification-type flame safeguard system, such as the *Protectoglo*. The *Ultra-Vision* sensor is easy to install, because it is insensitive to the refractory, and can be aimed at the flame from any convenient direction.

Now, for the first time, it's possible to have positive flame protection where protection formerly was difficult or impossible—in radiant cup burners and gas generators used to produce atmospheres for heat treating furnaces, for example.

Get complete details from your nearby Honeywell field engineer. Call him today... he's as near as your phone. Or write for Bulletin 95-2776.

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Honeywell

First in Control

Aluminum Structurals Give Navy Crane Strength Without Weight

TWO OF THE LARGEST industrial overhead traveling cranes ever built using aluminum alloy for major component structures, also hold the distinction of being among the first installed in a plant outside the aluminum production field. They have just been completed by the Harnischfeger Corp., Milwaukee, for the U.S. Navy Yard at Portsmouth, N.H.

The cranes have a span of 102 ft 3 in., with a 15-ft spread across the bridge girders, and weigh approximately 136,000 lb each. Each crane is equipped with an all-aluminum trolley frame carrying a main hoist of 45 tons capacity and an auxiliary hoist of five tons capacity. The main bridge girders are of box-type, all-welded construction and are all aluminum alloy—like the trolley frames, bridge end-trucks, cabs, platforms, railings, supports, machinery mounting brackets, walkways and ladders.

When installed, the cranes will operate on a common runway and will be fitted for locking together. When locked, they will be using a special all-aluminum equalizer lifting beam capable of handling lifts of approximately 90 tons. The two cranes will be installed on a second of three crane runway levels, one above the other, within the same building.

Cost of the two Navy cranes was approximately $250,000.00, somewhat higher than comparable cranes employing steel construction. However, a substantial savings was accomplished in obviating the need for strengthening the existing Navy Shop structure or reinforcing the foundations to accommodate the required increase in crane capacity. The two aluminum cranes provide more than the needed increase in capacity, with an approximate savings of 40 per cent in weight over conventional construction.

In addition, the aluminum cranes will require lower shipping and installation costs; when installed, the reduced weight will permit easier control and faster movement of cranes and their loads.

Waterwheel Generators Under Construction for New York Hydroelectric Project

THIRTEEN 167,000-KVA waterwheel generators, for the 720-million-dollar Niagara power project under construction by New York State's Power Authority, are being built in the Westinghouse Electric Corporation's East Pittsburgh, Pa. plant.

Spiders for the waterwheels are each 27 ft in diameter, and weigh 50 tons. A 40-ft boring mill was required to machine the spiders. Each spider will be mounted on a 50-in. shank diameter shaft which weighs 50 tons, when the components are installed at the site near Lewiston, N.Y.

Shipment of the parts for only one of the 120-rpm generators, not including the waterwheel, will require 34 railroad cars. Installation of the first unit is scheduled to begin early in 1960, and the project will continue into 1961.

With a maximum installed capacity of 1,950,000 kilowatts at the main generating plant, the Niagara project will be the largest hydroelectric project east of the Mississippi River and the second largest (outpointed in capacity only by Grand Coulee in Washington) in the United States.

Computer Training Center Features Closed-Circuit Television

RECENTLY DEDICATED by International Business Machines Corp., a new four-million-dollar education center features its own closed-circuit television network. The center is designed for customer executive education, IBM sales and customer engineering training, and has provisions to house IBM's general education program for its employees.

Closed-circuit television classroom lectures are transmitted from the building's data processing test center. They feature programs on computer maintenance techniques, machine operating procedures and service techniques.

In the test center, several of the most advanced computers are installed, incldiuing 705-III and 709 systems. These facilities are maintained for customer test of equipment before it is set up in their own offices, and for customer familiarization programs.

The three-story structure housing the center contains 124,000 sq ft of floor space, and is completely air conditioned. Parking facilities for 600 cars have been placed on the site, and the entire area landscaped to provide a campus-like atmosphere for the "school."

Do you use 4-foot fluorescents?

If you do, chances are 99 to 1 that they're either Rapid Start or starter-type lamps . . . or both. If so . . .

Here's General Electric's new F-40 Fluorescent that gives you these 5 big benefits

1. **FOR UNIVERSAL USE**—it operates in either a starter-type or Rapid Start circuit.

2. **SIMPLIFIED STOCKING, ORDERING AND MAINTENANCE**—this one lamp type now replaces two.

3. **6% MORE LIGHT**—2800 lumens—up from 2650 lumens delivered by previous G-E Rapid Start *or* starter-type lamps.

4. **SAME PREFERRED COOL WHITE COLOR**—most popular by far.

5. **COSTS 5¢ LESS THAN PREVIOUS RAPID START**

G-E LAMPS KEEP THEIR PROMISE—This is a fact which applies to every General Electric Lamp—whether it's fluorescent, filament or mercury. This newest General Electric first is no exception. You can depend on your new General Electric *F-40* fluorescents to *deliver* their rated life and rated light output. What's more, General Electric is *producing* these lamps—they're available now. General Electric Co., Large Lamp Dept. C-928, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 573 on Reply Card

Rolling Mill Features Rectifier Control, High-Pressure Water Descaling

COMPLETELY NEW IN THE UNITED STATES, and only the second of its kind in the world, is the power source that drives the mill rolls in Lukens Steel Company's new 140-inch slabbing mill. The four-high reversing mill has a maximum separating force of 12 million pounds, powerful enough to make a four-inch reduction in the thickness of a heavy carbon steel ingot in a single pass.

The power source consists of two back-to-back connected 8000 kw rectifiers that supply direct current to the mill's two main reversing drive motors. The first installation of this type is in a West German plate mill.

All other reversing mills in this country convert alternating current to direct current through a system of motors and generators. The new system at Lukens' Coatesville, Pa. mill offers several advantages; it requires no heavy foundations, requires no heavy crane for installation or maintenance, requires no fixed layout and is therefore easily fitted into any available mill space, requires no ventilating air since the rectifiers are water-cooled. Faster and more precise control of the reversing mill rolls is also offered by the rectifier installation, as compared with the motor-generator sets generally used.

Another "first" for the Lukens mill is the use of high-pressure water streams to descale slabbed ingots. Spray headers mounted above and below the horizontal mill table rolls deliver cold water at a pressure of 1500 psi at the nozzle, to remove scale. These spray headers are fed by two 1600-psi multi-stage pumps delivering water at the rate of 1000 gpm. The pressure used, 1500 psi, is approximately 300 psi greater than any other system in use in this country.

A flume system, lined with cast abrasion-resistant blocks, carries the scale from the mill and table rolls. Suspended in water, the scale is washed through the flume to a settling pit, where it drops to the bottom. The water is recirculated through the flume system, and makeup water comes from the descaling spray.

Automated Machine Tools, Tape-Controlled, Produce Generator Parts

A MULTI-MILLION-DOLLAR array of automated machine tools will be used at General Electric's Large Steam Turbine-Generator Department, to perform tasks such as drilling thousands of holes in 90-ton generator rotors or contouring steam turbine buckets to shapes never before possible.

One of the new machine tools does rough and finish boring of steam turbine cast steel inner shells—a complex problem because boring diameters vary from 16 in. to five feet. On this machine, the operator dials the position to which he wants the cutting tool to go, presses a button and the tool goes to that position with a tolerance of 0.001 in. The operator watches the chip by chip operation through a visual tracing in front of him with the aid of a closed-circuit television camera mounted near the cutting tool.

Another group of machines was designed and built to utilize new techniques in the manufacture of large buckets for steam turbines. These machines work entirely under the control of magnetic tape. The basic shape of the bucket is computed on a 704 IBM computer. The computer is then used to compute the path of the center of the cutter. Tapes which result from the 704 machines are put in a director, which has 4000 germanium diodes and 2000 transistors. Other information concerning the machine tool is fed into the director and a magnetic tape is produced capable of instructing the machine tool.

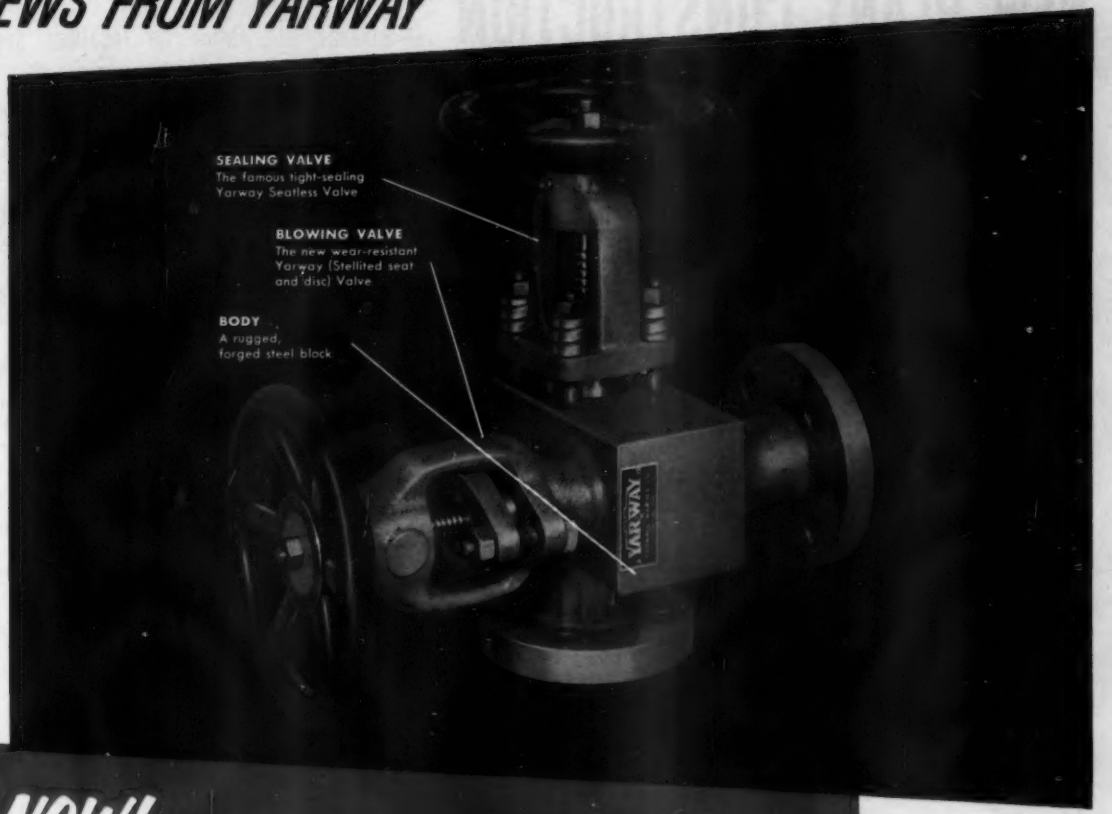
Also under tape control, another of the new machine tools will drill, ream, and bellmouth 100 holes in 1½-in.-thick bronze in ten minutes. This horizontal drilling machine is used to drill the tube sheets used in generator coolers. Each tube sheet may require from 100 to several thousand holes.

A fourth unusual machine tool is a 100-ft-long unit which machines copper bars used in conductor-cooled generator rotors. Normally about 300 pairs of bars, of some 150 varieties, are formed into a set of coils for each generator rotor. Two decks of punched cards are used to guide the machine. Long sections of copper bars are set on the center section of the machine tables and each of six machining heads in succession is brought into action. The 250 operations include, in addition to machining, the insertion and welding of plugs between the conductor bar ribs.

A tape-controlled horizontal drilling machine, with a four-sided turret, can be used to drill, ream, roundbottom or mill, or perform combinations of four different operations in succession, using multiple spindles.

Not yet installed, but "in the works," is a heat treating furnace which includes an 85-ton capacity rail car to move castings. Another planned unit is a turbine rotor testing facility to spin turbine rotors at overspeed in vacuum. This unit, to be set at floor level, will be covered by a 1000-ton cover which will roll into position. An inflatable boot will seal the facility during rotor tests.

NEWS FROM YARWAY



NOW! A NEW YARWAY UNIT TANDEM BLOW-OFF VALVE FOR MEDIUM PRESSURE BOILERS

There's a new star in the Yarway Blow-Off Valve line.

For years rugged Yarway Unit Tandem Blow-Off Valves have been standard equipment on most high pressure boilers. In fact, more than 80% of high pressure plants use Yarways.

Now a *new design* Unit Tandem is offered for *medium pressure boilers to 665 WSP.* Streamlined, lighter in weight, easy to operate, tight sealing and long wearing—this valve brings premium quality Yarway Unit Tandem dependability to the medium pressure field—*at a competitive price!*

Important features, like the nitralloy plunger in the sealing valve and integral stellite seat and disc in the blowing valve, make this your best buy for blow-off service.

Order Yarway Unit Tandems for your present boilers—or specify them on new boilers.

For full details write for Yarway Bulletin B-435, Supplement A.

YARNALL-WARING COMPANY
145 Mermaid Avenue, Philadelphia 18, Pa.
BRANCHES IN PRINCIPAL CITIES

YARWAY

For more facts circle 574 on Reply Card

NEW PLANT CONSTRUCTION —advance information on location, costs

Naheola, Ala.—The Marathon Southern Corp., a unit of the American Can Co., 100 Park Ave., New York, N. Y., plans major expansion of company's pulp and paper plant located here. Work will get under way at once on a $9-million expansion for increased capacity and will be completed by 1961.

Phoenix, Ariz.—General Electric Company's Computer Division, 1103 N. Central Ave., this city, has awarded a contract in the amount of $1.5-million for the design and construction of large plant addition to the company's Deer Valley Park computer manufacturing plant. Work has already begun on the addition and is scheduled to be completed by the fall of 1960. T. G. K. Construction Co., 2750 W. McDowell St., this city was awarded the contract.

Phoenix, Ariz.—Sperry Phoenix Company, Division of Sperry Rand Corp., 30 Rockefeller Plaza, New York, N. Y., plans a $1-million expansion that will almost double its present work force of 550. Construction is already under way on a 60,000-sq ft addition to the existing facility which produces aircraft instruments and flight control systems. The two-story addition, scheduled for completion by the end of this year, will provide added space for engineering activities in research and developments.

Greeley, Colo.—Greeley Capitol Packing Co., 500 Clarkson St., Denver, Colo., plans to construct a one-story and basement packing plant with a working area in excess of 100,000 sq ft. Work on the new plant, reported to cost in excess of $1 million, is proceeding on schedule and will be completed by the fall of 1960. Riley Engineering Co., 810 - 23rd St., Denver, are the engineers.

Wilmington, Del.—Du Pont Company's Elastomer Chemical Division, Nemours Building, plans to construct a $6-million research laboratory at company's experimental station located here. New laboratory will be devoted to fundamental and long range research in the field of elastomeric-rubber-like materials. Construction of the three-story structure is scheduled for completion by mid-1960.

Oahu, Hawaii—Permanente Cement Co., Kaiser Building, Oakland, Calif., plans to construct a large cement plant in the Waianae area of Oahu with an initial capacity of 1.7 million tons per year. Construction will start in the fall of this year and plant when completed in mid-1960 will go into full production. Company is also expanding its Honolulu distribution plant by 43 per cent, boosting storage capacity to 125,000 bbl. Cost of the new facility will represent an investment in excess of $12 million.

Bridgeview, Ill.—Ajax Box Division of St. Regis Paper Co., 2210 S. Union Ave., Chicago, Ill., plans to construct a corrugated paper manufacturing plant on building site located in this city. New facility will be a one-story brick and steel structure covering an area of 165,000 sq ft. Preliminary work on the structure is already under way and is scheduled for completion by late 1960. Work is under the supervision of Miller-Davis Co., 38 S. Dearborn St., Chicago, Ill., and will cost an estimated $1 million.

Chicago, Ill.—Fansteel Metallurgical Corp. plans to construct a plant for the production of silicon power rectifiers. Work on the new facility will get under way at once and new plant is slated to produce about 30,000 rectifiers daily. These are used in automotive alternator-rectifier electrical power systems. Plant is expected to be completed by late 1960 and is reported to cost in excess of $1 million.

Detroit, Mich.—Strick Trailer Division of Fruehauf Trailer Co., 10941 Harper Ave., this city, plans to construct a plant in Bucks County, Pa. Construction will begin soon and is to be completed in 1960. The 130,000-sq ft plant will be used to produce trailer equipment that can be transported by truck, rail or water. Plant when completed will represent an investment in excess of $3 million, with equipment.

Midland, Mich.—Kaiser Chemicals Division of Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif., plans to construct a plant here for the production of high-purity periclase, a dense crystalline magnesia used in basic refractories that line the walls of high-temperature industrial furnaces. Plant is scheduled to go into production early in 1960 and will be built at a cost of $3 million.

St. Louis, Mo.—Gereke-Allen Carton Co., 5101 Penrose Street, St. Louis, Mo., subsidiary of the Weyerhaeuser Timber Co., Longview, Wash., plans to construct a paper box manufacturing plant on large site at Lindbergh-Warson Industrial Park, located here. Work on the one story, masonry and concrete structure will begin soon and will have a manufacturing area of approximately 120,000 sq ft when completed by the fall of 1960. Plant and equipment will cost in excess of $1 million.

New Brunswick, N. J.—E. R. Squibb & Sons, Division of Olin Mathieson Chemical Corp., Mathieson Building, Baltimore, Md., will build a packaging and warehousing facility at company's pharmaceutical plant here. The plant which will also be used for the formulation of various pharmaceutical products will get under way soon and is scheduled for completion by mid-1960. New addition will cost $2 million.

Mansfield, O.—Tappan Company has announced a $3.7-million expansion program over the next two years at its plants in Mansfield, O., and Murray, Ky. The Mansfield program includes the purchase of land for a new manufacturing building to cost about $250,000 and construction of a new building to house a steel coil and shear line. Total production capacity will be increased by 30 per cent through the expansion. An enameling plant will be added to the company's Murray, Ky., plant and other changes will boost capacity 50 per cent.

Warren, O.—Republic Steel Corp., 1405 Republic Building, Cleveland, O., plans a $375-million program for capital improvements between now and 1963. Plans are under way for the construction of a 56-in. hot strip mill, to cost more than $45 million. The mill will be the first major project to be undertaken under this gigantic program and will have a capacity to roll 145,000 tons a month. Mill is scheduled to go into operation the latter part of 1960. A new building with more than 300,000 sq ft of floor space will be built to house the mill.

Philadelphia, Pa.—The Barrett Division of the Allied Chemical Corp., 40 Rector St., New York, N. Y., plans to construct a dry felt manufacturing plant to replace an outmoded plant in Elizabeth, N. J. New facility will be erected adjacent to company's South Philadelphia roofing and building materials plant.

Tarentum, Pa.—A. P. Green Fire Brick Co., 1108 E. Breckenridge St., Mexico, Mo., has awarded a contract in the amount of $3 million for the design and construction of a large basic refractory plant to J. G. Kassab, Inc., 2 Gateway Center, Pittsburgh, Pa. Work on the new plant is already under way and is expected to go into production late in 1960.

Garfield, Utah—Kennecott Copper Corp., Utah Copper Division, Kearns Building, Salt Lake City, Utah, plans a renovation and modification of its smelter at refinery here, including replacement of 48 roasters with systems of feeding "green concentrates" to five reverberating furnaces. Work will begin at once on the program which is expected to be concluded by 1961 at a reported cost of about $10 million.

ANOTHER OF THE GARLOCK **2,000**

Metal plates, spot-welded together, provide cup with backing entirely of metal ("A"), are stepped to give metal to metal contact ("B").

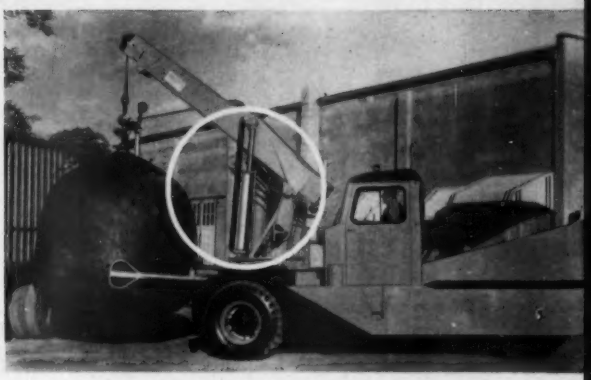
Where SERVICE is TOO ROUGH for ORDINARY CUPS...

Garlock Metal-Backed Cups offer positive sealing

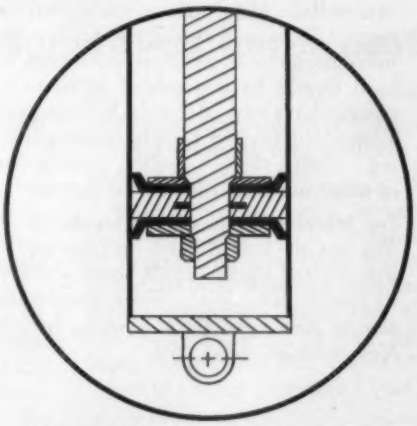
A new, patented Garlock Cup construction provides metal reinforcement across the back and through the center of the cup. Under pressure, they actually support themselves without extruding at the heel. And, by bolting the cups to the back-up support of the piston assembly, a metal-to-metal contact is established—once tightened, it never loosens . . . eliminates compression loss.

Garlock Metal-Backed Cups help assure safe, smooth hydraulic operation of cylinders on heavy duty equipment such as the hydraulic crane illustrated at right.

Available in widely-used fabric, or in synthetic rubber. Garlock Metal-Backed Cups come in standard sizes ranging from 1½" to 14½". They are another important part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for all your needs. Let your Garlock representative recommend the best style for your application. Call him, or write for bulletin AD-145.



Garlock Metal-Backed Cups are used for dependable operation of hydraulic cranes manufactured by Grove Manufacturing Company, Shady Grove, Pa. Circle indicates hydraulic cylinder on which cups are used.



THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 26 sales offices and warehouses throughout the U. S. and Canada.

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Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

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Stop these maintenance miseries (and others) in your plant...

Molysulfide™

is the cure!

Sure, problems like frozen nuts and galled spline drives won't put you out of business—but they'll put a crimp in your important maintenance schedules! The answer?

Molysulfide paste lubricants! These special lubricants—containing 25-70% Molysulfide—are tailor-made for the toughest maintenance-lubrication problems you've got. Here's why . . .

Molysulfide films out on metal surfaces. It forms a *rugged, heat- and cold-resistant, low-friction film* that prevents metal-to-metal contact even after man-sized hard knocks have pounded or squeezed base grease away. That's why Molysulfide *stays put* to lubricate as a long-term cure for such headaches as galling and seizing . . . stick-slip . . . chatter, fretting, and a whole host of other miseries. *But see for yourself!*

Try Molysulfide paste lubricants in your own shop. *Try just one pound*—order it from any of the manufacturers listed below. You'll agree—Molysulfide is worth its weight in aspirin! *Climax Molybdenum Co., a division of American Metal Climax, Inc., 500 Fifth Ave., New York 36, New York.*

CLIMAX MOLYBDENUM

Try a pound of Molysulfide paste lubricant for heavy-duty maintenance applications! Order it today from any of these well-known manufacturers: Acheson Colloids Co., Port Huron, Mich. • The Apha Molykote Corp., 65 Harvard Ave., Stamford, Conn. • American Lubricants Co., 1227 Deeds Ave., Dayton, Ohio • Basco, Inc., 730 W. Jackson St., P. O. Box 461, Milwaukee 1, Wisc. • Bel-Ray Co., Green Village Rd., Madison, N. J. • Bemol, Inc., 131 State St., Boston 9, Mass. • Fiske Bros. Refining Co., 1500 Oakdale Ave., Toledo, Ohio • Hohman Plating & Mfg. Co., Inc., 905 East 3rd St., Dayton, Ohio • Jet Lube, Inc., 3093 N. California St., Burbank, Calif. • McGee Chemical Co., 8000 West Chester Pike, Upper Darby, Pa. • Ore-Lube Co., 11 Front St., New York, N. Y.

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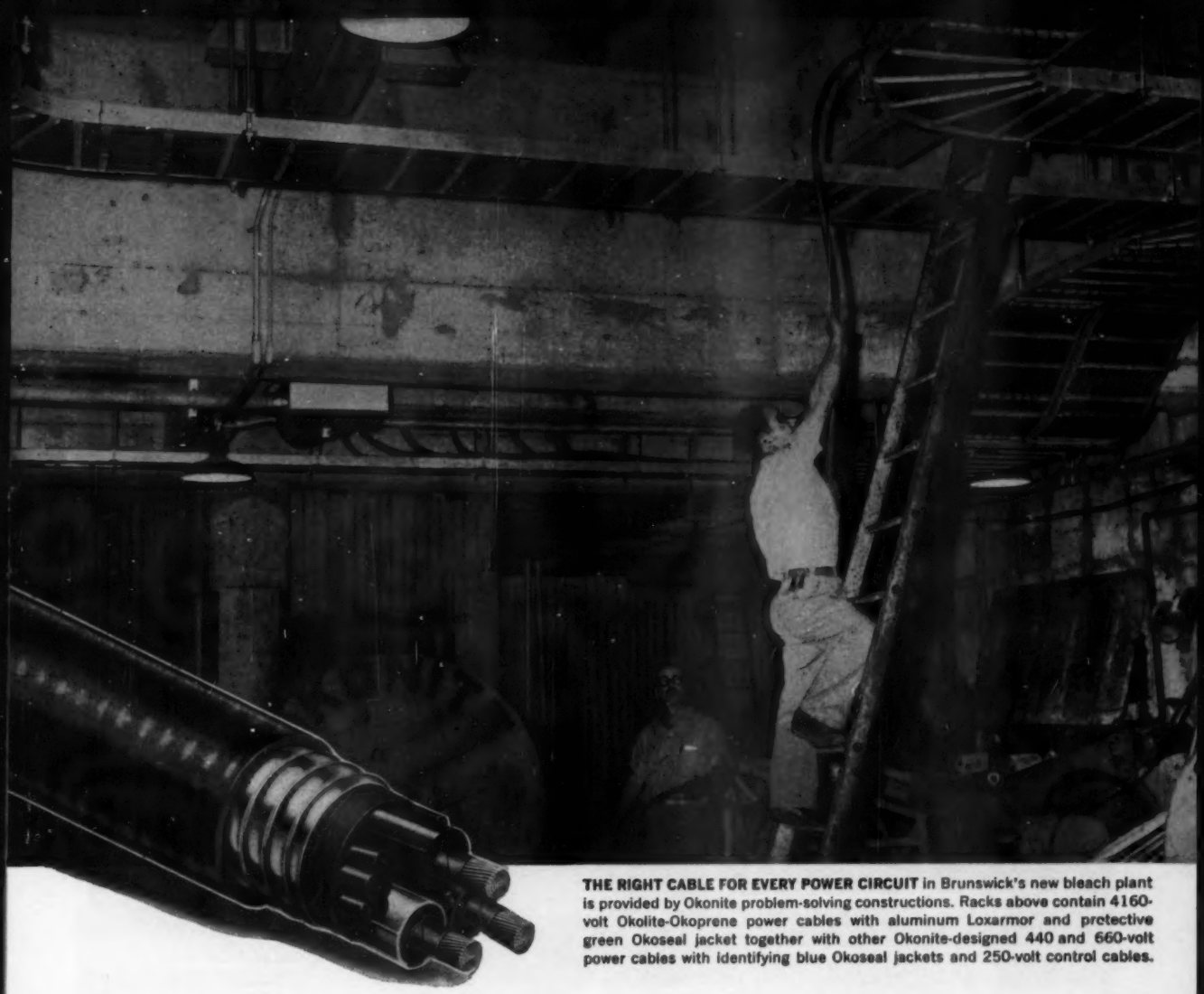

THE RIGHT CABLE FOR EVERY POWER CIRCUIT in Brunswick's new bleach plant is provided by Okonite problem-solving constructions. Racks above contain 4160-volt Okolite-Okoprene power cables with aluminum Loxarmor and protective green Okoseal jacket together with other Okonite-designed 440 and 660-volt power cables with identifying blue Okoseal jackets and 250-volt control cables.

Okonite cable gives Brunswick Pulp & Paper maximum protection in chemical atmosphere—at lower costs

PROBLEM: For one of its vital electrical circuits, Brunswick Pulp and Paper Company's new bleach plant for modern, high-graded processes needed a primary distribution cable of 4160-volt capacity that could stand up to chemical attack. Mindful of the penalties of plant down time they sought maximum circuit security. They also wanted lower installation costs.

SOLUTION: They got both a superior cable and a less expensive installation by using Okolite-Okoprene 5kv cable with an aluminum Loxarmor covering and Okoseal jacket.

HERE'S WHY: *Okolite insulation*, applied by Okonite's exclusive strip process for maximum quality control, is moisture, ozone and heat resistant with lasting high dielectric strength. *Okoprene sheath* gives positive protection from moisture and most harmful acids, oils and chemicals. Lightweight *Aluminum Loxarmor*, for use in racks, eliminates the installation expense and the difficulty in changing a conduit system. *Okoseal* PVC (polyvinyl chloride) jacket was selected to counter specific chemical conditions in the plant. Colored green, it also identifies the primary circuit.

Okonite makes cables by all the known methods, has a background of 80 years of experience. You will get sound and unbiased recommendations when you call on your Okonite representative. In the meantime, ask for Bulletin PE-1117 on "How to Choose Insulated Cable."

THE OKONITE COMPANY
Subsidiary of Kennecott Copper Corporation
Passaic, New Jersey

where there's electrical power . . . there's **OKONITE CABLE**

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6377

The Image of CF&I offers . . . for every industry . . .

Wissco Woven Wire Processing Belts

The giant steelman reflects generations of steel-making experience that results in durable, more efficient steel products for industry. For processing and conveying purposes, CF&I-Wissco Woven Wire Metal Belts offer these advantages for friction or chain edge drives:

Open Mesh—Allows free drainage—permits free air circulation for fast, uniform heating and cooling.

Strength of Metal—Fabricated to specifications in plain, tinned, galvanized, stainless or special alloy steel, Wissco Belts provide long, trouble-free service.

Corrosion Resistance—You can select a steel belt—high carbon, galvanized or stainless—which minimizes replacement costs and reduces maintenance.

These advantages mean long operating life and increased production for you, and make Wissco Belts a "must" where temperature extremes and every day wear factors are severe. You'll find that Wissco Belts are ideal for baking, cooling, drying, degreasing, spraying and washing.

If your operation uses temperatures 800° to 2100°F and higher, specify Wissco Alloy Steel Belts. They are furnace-tested to assure dependable, smooth performance, and are excellent for annealing, hardening, enameling, sintering and similar operations.

In addition, special alloy Wissco Lehr Belts with flat supporting surfaces are available for glass annealing and decorating.

Call our experienced representative today for complete information on the Wissco Belt that will best fit your manufacturing process. And remember, Wissco Belts are usually shipped on reels for fast, simplified installation.

WISSCO BELTS
THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
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Goodyear specifies Homestead Valves for non-contamination of GR-S latex rubber

Homestead lubricated plug valves handling latex rubber.

Through the round ports of Homestead Lubricated Plug Valves at Goodyear Tire and Rubber Company's synthetic rubber plant in Houston, Texas, flow dilute solutions of GR-S latex rubber at 80 p.s.i. and 100° F.

Fluid solutions never lodge and build up in the line since Homestead Round Port Valves provide full circular opening through plug and body of the valve—same size as the pipe they serve.

Controlled pressurized lubrication plus extremely close tolerances between plug and body assure lubrication of all sealing surfaces without contamination of line fluids.

Write for complete details on low first cost, low maintenance, Homestead Valves in our catalog 39-1.

☐ Please send me catalog and prices on Homestead Lubricated Plug Valves.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 207, Coraopolis, Pennsylvania

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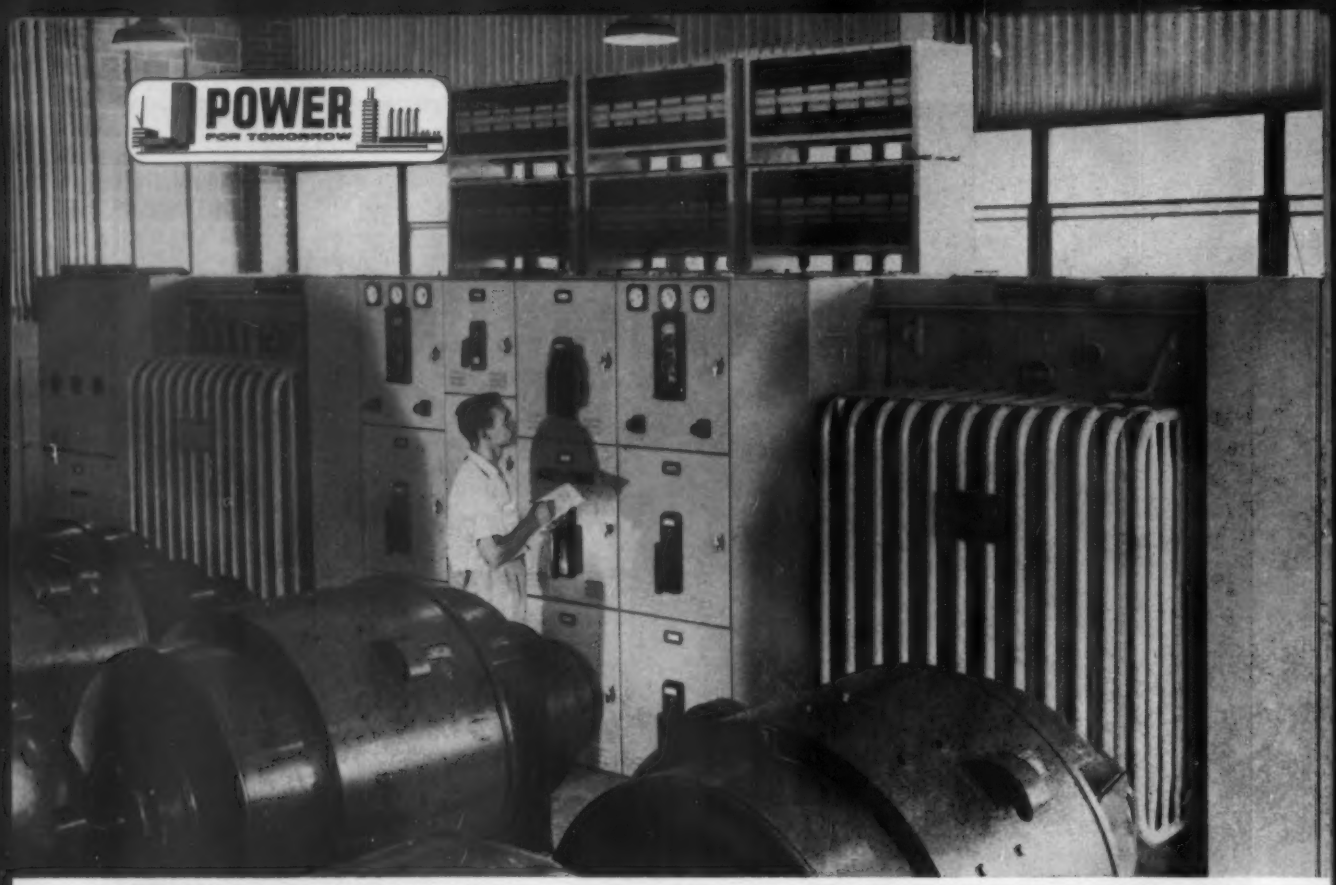

BUILDING BLOCKS OF POWER, load center unit substations, can be added easily to existing system to handle new load. This keeps capital investment at a minimum. G-E shunt capacitors in racks improve power factor, save on power costs.

SAVINGS UP TO $30/KVA!

Boost plant power NOW with General Electric 480Y/277-volt equipment. It pays off in reliable, quality power.

Converting to a reliable G-E 480Y/277-volt distribution load center system represents a profitable alternative to continued patching of an old installation, and can be carried out on a step-by-step basis over a period of time. Here are good reasons why:

RELIABLE SYSTEM performance depends on component reliability and built-in product features. General Electric unit substations incorporate standardized components manufactured under rigid quality-controlled conditions. Yet G.E. offers you a wide choice of units with capacities and ratings virtually custom-engineered to satisfy your requirements. These units, and other system components like metalclad switchgear, plug-in busway and transformers are designed for easy installation, or relocation to handle load density shifts.

QUALITY POWER is essential for efficient production, longer equipment life and power bill economies. One way that General Electric 480Y/277-v systems help accomplish this is by using shunt capacitors to improve power factor. Service-proven G-E Pyranol® liquid-filled capacitors—located close to loads—reduce system losses and increase system capacity as much as 20% or more.

FIRST-COST DOLLAR SAVINGS are realized with General Electric high-voltage power distribution systems because fewer, smaller conductors and circuit breaker components are needed. Savings increase substantially . . . up to $30 per kva . . . where feeder lengths exceed 200 feet. You also cut engineering and installation costs. G-E primary switchgear and unit substations are factory-assembled in large sections for easy handling and fast installation. Outstanding product features, coupled with General Electric's system-engineering services, simplify purchasing problems and protect your system investment.

WRITE FOR FREE BULLETIN on General Electric 480Y/277-v power distribution equipment, or contact your local G-E Apparatus Sales Office for more information. General Electric Co., Sect. 680-17, Schenectady 5, N. Y.

GENERAL ELECTRIC

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titeflex*

flexible metal hose satisfies your plant's needs 3 ways

1. INNERCORE TO TRANSFER ANY FLUID
Of high quality metals and alloys . . . in many different sizes . . . strengths . . . and flexibilities . . . for the toughest jobs.
2. WIRE BRAIDING FOR GREAT STRENGTH
TITEFLEX weaves round wire, metal ribbon, or combinations of both into high quality braid coverings. Weaves and metals used match each hose's needs in flexibility, high pressure, abrasion resistance.
3. FITTINGS
Designed and precision-made to fit both hose and connections perfectly.
*T.M. of Titeflex, Inc., pat. pending

Companies specify TITEFLEX metal hose for good reason. From end to end . . . inside and out . . . it's made *right* in our own plant. Rigid quality control makes for top performance. Superb TITEFLEX engineering, famous in the field, produces metal hose that is lighter, more flexible, with a smaller bending radius. More and more companies look to TITEFLEX for dependability and engineered help for their applications.

Your TITEFLEX distributor is in the Yellow Pages, or write direct for complete information and specifications.

titeflex

titeflex inc. springfield mass. PACIFIC DIVISION • SANTA MONICA • CALIFORNIA

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NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 185-186

1—AMPLIFIER aids low-level d-c voltage measurement

Model P Amplifier is an electronic low-voltage linear amplifier designed to increase speed and accuracy of low level d-c voltage measurements. The d-c unit is described as ultra-sensitive, capable of developing full electrical output in less than 0.1 sec, and compatible with inputs from thermocouples, radiation pyrometers, thermal converters anl d-c strain gages. Applications include temperature measurement and control, telemetering, stress measurement and automation, in addition to basic d-c preamplification functions. Full scale response is listed at better than 0.1 sec, and long-time measurement accuracy as ±¼ per cent of input range for 5 mv and up. Model P is available in multiple fixed and adjustable ranges, with or without adjustable zero suppression, for rack or wall mounting. Bulletin MSP-111.1 gives data. Controls Div., Hagan Chemicals & Controls, Inc.

2—DOCK LEVELER is fully automatic unit

Mech-O-Dock, Model ML-68, comes factory assembled and adjusted; it may be installed in front of the dock or in a recessed pit. Minimum installation cost and low initial cost are reported. The unit is self-contained and completely automatic—as a truck backs in and contacts the bumper actuating mechanism, the ramp rises and lowers again to rest on the truck bed. As the truck pulls away, the Mech-O-Dock levels flush with the dock. Automatic locks are designed to support the platform at dock level for 20,000 lb of cross or rollover traffic load, and locking "safety wedge" action serves to prevent the locks from disengaging under the load. The Wayne Pump Co.

3—CIRCULATING FANS for use in hazardous locations

These circulating and cooling fans are announced as featuring explosion-proof motors with UL approval for Class 1, Group D installations—gasoline, alcohol and lacquer solvent fumes, propane and butane gas. Constant-speed type motors available are 115- or 230-v, single-phase, 60-cycle units, and 220- or 440-v, three-phase, 60-cycle units. Fan wheels are non-ferrous. The units have explosion proof starter mounted and wired to the motor with rigid conduit. Explosion-proof cable and connector are available. The fans may be had with pedestal base, or with wall or ceiling mounting. Catalog 159 gives specifications. Ilg Electric Ventilating Co.

4—SOLDER TYPE ALLOY for use with magnesium

EutecRod 1909 is a low melting solder-type alloy that can be used without separate flux on magnesium. The lead-free chemistry of EutecRod 1909 is so formulated that it begins melting at only 350 F, company points out, well below transformation temperature of heat-treated magnesium alloys. Primarily the alloy is for building-up, filling and sealing castings, wrought forms and extruded shapes. Complex casting with imperfections can be salvaged with it at low cost, says manufacturer. EutecRod 1909 will also join aluminum to itself or to other metals when the correct flux is employed. Eutectic Welding Alloys Corp.

5—INSULATION for temperatures up to 1600 F

Careytemp, a pipe and block insulation, is composed of expanded silica with a special binder and reinforced with an inorganic fiber. For temperatures to 1600 F, Careytemp is reported to offer exceptional water resistance, light weight at no sacrifice of strength, and ease in cutting—even cracker thin—without crumbling. The Philip Carey Mfg. Co.

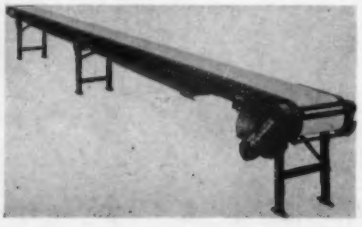
6—FOG SPRAYER works faster to kill insects

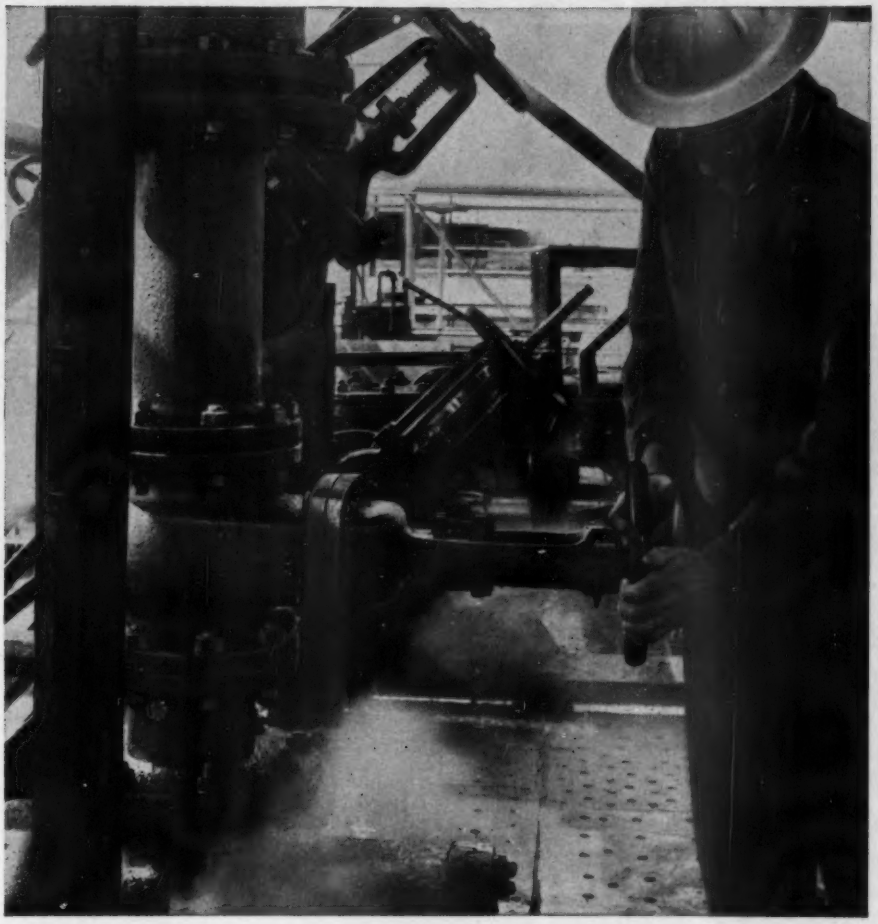
The Spacemaster, a mobile insecticide sprayer is introduced for large or small areas where compressed air is unavailable for fogging. Its spray head of five aerosol nozzles is claimed to dry fog insecticide three times faster than conventional two-nozzle sprayers. Key advantages stem from these

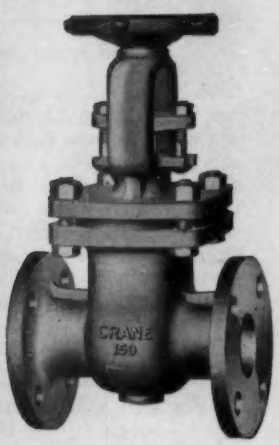
aerosol nozzles which produce a uniform dry fog of insecticide particles in the range of 12 to 15 microns average diameter. With a potent insecticide, flying insects in 5000 cu ft can be fogged in 1 min, according to manufacturer, and crawling insects in 2 min. Range is given as 40,000 to 50,000 cu ft from one position; capacity is up to 380,000 cu ft without refilling. The Spacemaster is controlled by an automatic 1-hr time clock. West Chemical Products, Inc.

7—CONVEYOR is horizontal, belt-on-roller type

Announced as offering greater versatility, flexibility of application and economy of operation are these simplified horizontal belt-on-roller conveyor units. They are designed to handle bags, boxes, cartons, drums, other items and are available in two series. For light to medium duty, Series 904 is offered in three power drives of ½, ¾-and 1-hp capacities, and six belt widths from 8 to 24 in. For medium to heavy duty, Series 905







"Craneloy 20"—No. 20045 gate valve. ½" to 12"; 150 psi at 500 F; 230 psi at 100 F.

Crane split-wedge disc design. Free-to-rotate discs employ special guides to prevent rubbing against seat during operation.

"Craneloy 20" valves—performance-proved on toughest corrosive fluids

The "Craneloy 20" gate pictured above controls highly corrosive, hot sulphuric acid sludge at a large Western refinery. While other valves in this service had to be replaced every 3 to 6 months, this Crane valve lasted a full 14 months before requiring minor repairs.

All parts in contact with the flow are "Craneloy 20"—a high-nickel, high-chromium stainless alloy—poured in Crane's own foundries.

Crane alloy valves (either "Craneloy 20" or Type 316 stainless) give you an extra measure of value. Unique design of the split-wedge disc provides *uniform* pressure all around the seating surface . . . eliminates need for high seating forces. Free-to-rotate discs minimize seating wear and prevent galling.

For details of other features and applications of Crane alloy valves, see your Crane Representative.

Get full facts on "Craneloy 20" and other Crane quality alloy valves. Ask your Crane Representative for Circular AD-2080 or write to the address given below.

CRANE® VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Illinois—Branches and Wholesalers Serving All Areas

For more facts circle 582 on Reply Card

NEW PRODUCTS

(Begins on page 144)

offers power drives up to 5 hp and belt widths from 12 through 48 in. in 6-in. increments. Both series can be provided with rollers on 3- to 12-in. centers formed of 13- or 16-in. gage steel. Lengths are pre-engineered standard sections, joined to make the desired span. The units can be adapted for use with gravity conveyor or other handling equipment. Rapids-Standard Co., Inc.

8—LIQUID LEVEL CONTROL for wet salt storage

The Levetrol Brine System is a method of liquid level control in a wet salt storage system where water level automatically is proportioned to brine withdrawn. Adaptable to any wet salt storage system, it protects against salt loss due to brine overflow by balancing water level with salt level. According to company, Levetrol solves the problem of salt and water inventory and permits complete automation of water treatment system. Controls are located away from brine storage supply. Morton Salt Co.

10—SHEET FANNERS have stronger ceramic magnets

For handling semi-sticky, bent and heavier gauge steel stock, this group of Ceramic-V fanners is announced as combining structural ruggedness with superior performance characteristics. The assembly is designed to maximum physical strength and tamper-proof construction. The units have a stainless steel, welded enclosure, reinforced and supported by a steel back bar; ceramic pressings and back bar are enclosed and locked into position with an epoxy. Available in medium, heavy, and extra heavy duty strengths, the units come in a variety of heights for applications up to ⅛-in. thick steel sheets stacked up to 14 in. high. Most impressive performance of these fanners is said to be in handling of heavier gage sheets. Eriez Mfg. Co.

9—ENGINEERING DESK assembles easily, stores compactly

The Assemblor is described as a flexible engineering desk which can be assembled or disassembled in a few minutes without tools. Offering both convertibility and ease of installation, the all-steel unit can be changed from a drafting table to an engineering or general office desk. Absence of protuberances on component parts permits compact storage. When disassembled, the Assemblor consists of three separate parts with all cross member supports stored within the top.

The 31-in. height lets draftsmen sit in low, posture-type chairs. Table top is 43½ by 72 in., and has an adjustment tilt bar which, when raised, gives a 6-deg inclination. Two file drawer pedestals support the top and provide storage capacity. One has two utility drawers, letter-size catalog drawer and a catalog and book compartment at the rear of the unit (inset right). The drawers have a plunger key lock. The other pedestal has two full length drawers, fastened by a security bar lock (inset left). Roll tracing holders on each side of the Assemblor permit work with drawings longer than 72 in. The unit is finished in gray and has a steel top covered with off-white linoleum. Hamilton Mfg. Co.

11—1-IN. GATE VALVE resists erosion and corrosion

Although designed for oil field water flooding service, this 1-in. valve is suggested for use wherever corrosion and erosion are problems. It is described by manufacturer as 1-in. No. 18857 18-8 SMO plug gate valve with screwed ends, and said to offer combined advantages of a gate valve, and a plug disc globe valve. Features announced include tapered non-turning plug disc; stem pinned to disc; handwheel attached to yoke sleeve; reduced seat and fine stem threads; O-ring bonnet joint, and a rating of 1500 psi water, oil or gas working pressure. Crane Co.

12—OFFSET HEX WRENCH works in close quarters

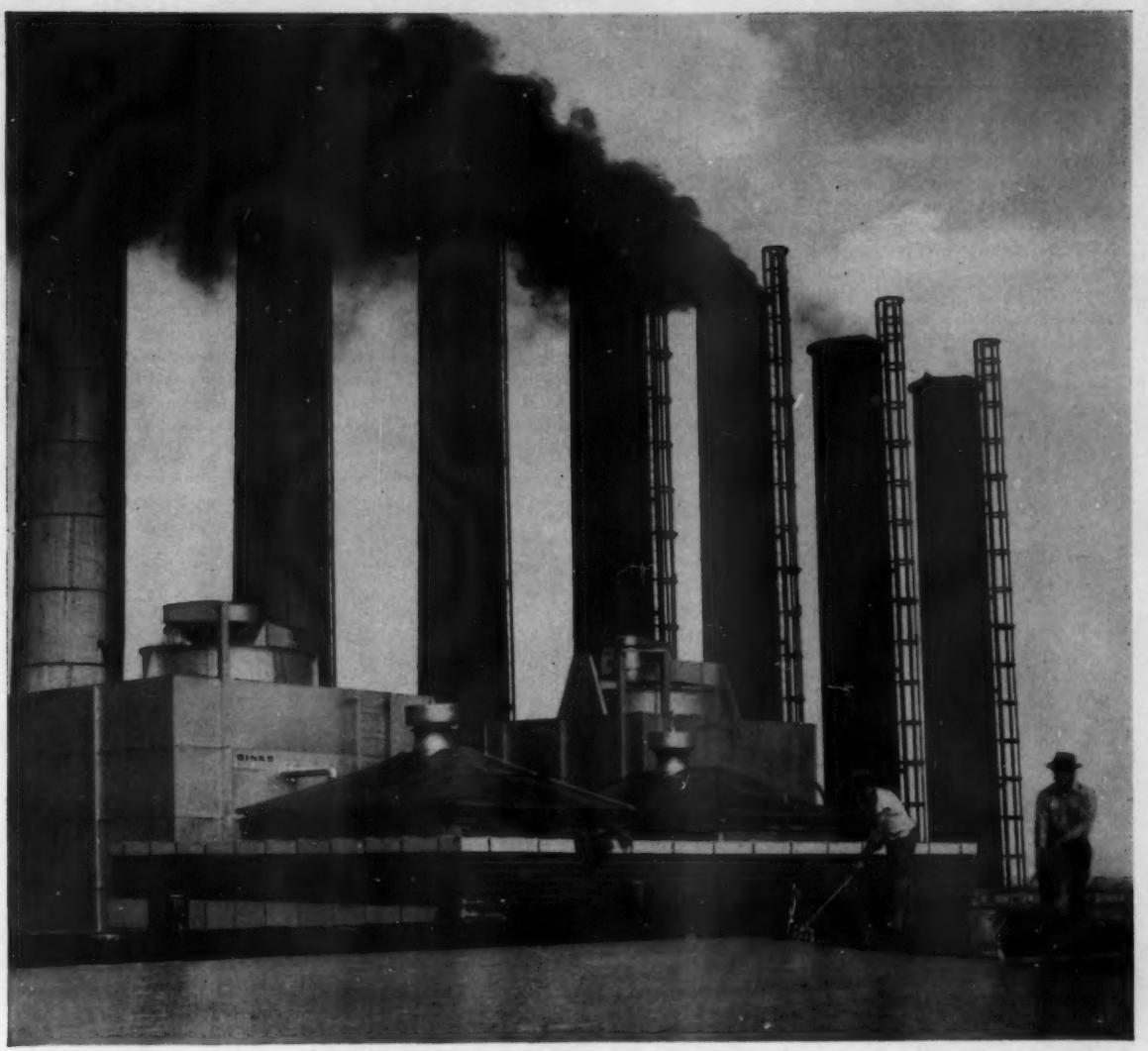
The No. E-110 Offset Hex Wrench is especially designed for use on hard-to-get-at sink and tub drain nuts and other nuts and fittings in tight quarters. Its easy-on, non-slip, multi-sided grip gives extra leverage on all hex nuts, square nuts, valve packing nuts, unions and gas cocks. Thin jaws of wrench are designed to fit narrow nuts and slip into tight places. Maximum opening across flats is 2⅛ in., handles up through 1½ in. drain nuts. The Ridge Tool Co.

13—EPOXY PAINT formulated for severe service

Although developed for marine use, Epoxy Marine Paint is reported successful for painting smoke stacks where heat and corrosion are encountered and for other severe service applications. Superior adhesion and life and easy application are claimed. Also the paint is self-priming and offers advantages in flexibility and self-leveling high gloss, says manufacturer. It is a two-part, 50-50 mix system with coverage given as up to 600 sq ft per gallon. This paint comes in nine colors, can be applied by brush, spray or roller. Company says it can be used over almost any clean old or new surface, even over old paint, if sound. Fibre Glass-Evercoat Co., Inc.

14—STORAGE CABINET has double doors, many uses

In this large-capacity heavy-gage cabinet, shelves are adjustable on 2-in. centers without tools. Any number of shelves may be ordered, in addition



resists corrosion attack

Aluminum paint protects metals from corrosive fumes, smoke and gases

The Finest Paints Made with Aluminum are made with REYNOLDS ALUMINUM PIGMENT

The thin, solid coat of aluminum that forms on surfaces painted with aluminum provides a lasting protective shield against rust and corrosion. Weathering exceptionally well, paint made with Reynolds Aluminum Pigment offers the major benefits of solid aluminum in liquid form. It's easy to apply, economical to use—and adds years of service life to the structures it covers. *Reynolds Metals Company, P.O. Box 2346-PL, Richmond 18, Va.*

REYNOLDS ALUMINUM

Watch Reynolds TV show—"WALT DISNEY PRESENTS"—every week on ABC-TV.

For more facts circle 583 on Reply Card

NEW PRODUCTS

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to the four supplied with the standard unit, up to a maximum of 16. The cabinets are welded at vital points and bolted by a concealed method—bolt-heads don't show on the exterior. A cornice top overhangs at the front to keep out dust, and a reinforcing bracket around the inside of the top provides rigidity. The cabinets have three-point security latches, grooved key locks, chrome plated handles. Standard colors are gray and green; six special colors are available. Dimensions are 78 in. high, 36 in. wide and 24- or 18-in. deep. Penco Div., Alan Wood Steel Co.

15—DISPOSABLE CLOTHING —throw away when soiled

This line of disposable garments includes shirts, pants, lab coats, hats, boots, aprons and gowns. Manufacturer says they are durably made of newly developed materials and are soft, light and comfortable like woven cloth. The clothing is announced as economical in price, fire-resistant and water repellent. For regular plant personnel or visitors, these garments can be worn over street clothes or as outer clothing. They are lint-free, says company, and can be autoclaved. Bulletin 700 gives full information. General Scientific Equipment Co.

16—WELDING TORCH for light duty applications

For plants having only intermittent applications and for light uses of the Arcair process, Model H-2 Arcair Torch is the smallest of the manual operated ones. An improvement over

the Model G-2, which it replaces, this torch has an air control valve in the handle. By holding the air orifice in the head of the Model H-2, within 4 in. of the work, this metal remover torch can be operated on as low as 40 psi of compressed air—half of the required minimum air pressure used by the larger models. It costs the same as the previous model—around $50.00. Arcair Co.

17—TERMINAL BLOCKS snap together to stay

Semi-elastic zytel Series G Alpha Blocks come in 10 colors for simple circuit coding; they are designed to snap together to form rigid rows which cannot separate after being fastened down. Insulating barriers are integral in each block. The tiny blocks measure only ⅜ in. wide, 13/32 in. high to top of barrier, ¼ in. high to top of block, ¾ in. long. Rating is 20 amp at 110 v. Despite small size, insulation protection is provided between blocks and fastening screws and panel, and between block pairs, it is pointed out, and electrical connection between pairs is an integral part of the block. The color varieties facilitate coding and subsequent identification. Contact screws are nickel-plated No. 4-40 binding head. Each block has a countersunk mounting screw hole; however, up to 15 blocks can be snapped together and mounted with one screw at each end. Alpha Electric Products Co.

18—QUICK COUPLINGS with severe-service gaskets

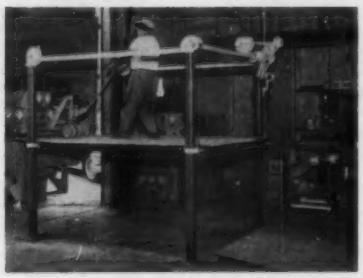
Kamloks—for use wherever hose or pipe connections are disconnected periodically—are now available with Viton-A gaskets. These gaskets are suitable for hard-to-handle chemicals and tough steam services, it is stated; they are highly resistant to deterioration and retain flexibility and long life under adverse conditions. Kamloks with Viton-A gaskets are announced as suitable for pressures to 200 psi and temperatures to 500 F. Details are in Bulletin F-10-4. OPW-Jordan.

19—PUMP transfers material from original containers

Pogo SS is an air-operated, reciprocating type stainless steel pump for pumping and transferring of materials direct from their original 55-gal containers. It is suggested for handling fluids that might be contaminated, such as pharmaceuticals, dyes, inks, soaps, alcohols, latex, and many corrosive liquids. It weighs only 20 lb and is space-designed with air motor and pump sections separated to avoid possibility of material entering motor or other critical parts. The motor requires only minimum amount of air, it is pointed out, and the pump delivers 3 to 5 gpm, delivering on both up and down strokes. Seven models and accessories are available. Binks Mfg. Co.

20—WIPING TOWELS are lintless and absorbent

According to manufacturer, these towels are made of selected fibers and conditioned to be lintless for use in plants where even smallest dust particles can be a deterrent. They are available in four sizes from 18-by-18 to 18-by-36 in. and treated to remain highly absorbent, yet soft and pliable, so as not to damage even precision optical equipment. Industrial Wiping Cloth Co., Inc.



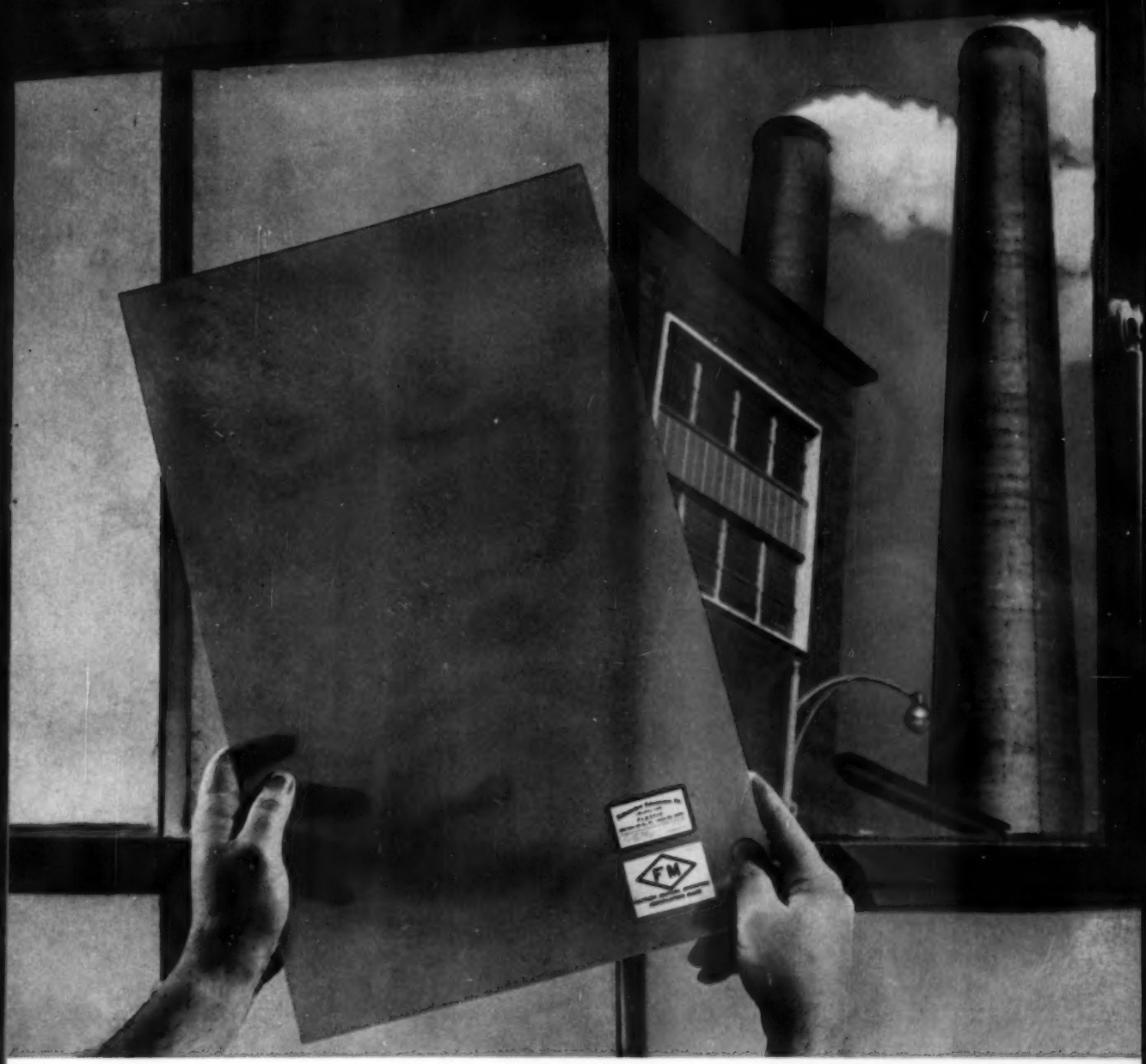
21—ELECTRIC PLATFORM can lift up to 3 tons

Quick installation indoors or out plus ease of re-location is claimed for the Electro-Loader, an electric motor powered 6-by-8 ft platform lift with a 6000-lb capacity. In the installation shown, a cargo of storage batteries is unloaded by two men in 45 min—a job that formerly took four men a total of 4 hr. The unit is powered by a 1-hp motor operating a cable-and-sheave linkage through four supporting posts. Rising height is 5½ ft. A hinged throw-over bridge plate spans the gap between carrier bed and lift platform in raised position. Globe Hoist Co.

22—DETERGENT provides metal cleaning advantages

Improved efficiency in soak tank cleaning of a diversity of metal parts, including machine tools, stamping, nuts and bolts is announced for Triton QS-15. It is reported to combine vigorous detergent action with solubility in relatively high concentrations of alkaline cleaners, while at the same time exhibiting chemical stability in strong caustic. According to manufacturer, this desired combination is offered in Triton QS-15 because it is anionic under alkaline conditions and cationic under acid conditions and hence amphoteric. Also, Triton QS-15 is a 100 per cent active ingredient, it is stated, whereas many amphoteric detergents contain up

For more facts circle 584 on Reply Card ⟶



See? This plastic glazing *retards fire*

You know it's safer—the labels prove it.

When you glaze with nonshattering plastic, insist that the material carry the Underwriters' label, the Factory Mutual seal of approval, or both.

They tell you that the plastic has passed severe flame-spread tests, accepted as realistic by industry and by code authorities. It won't support combustion—can't ever propagate a blaze.

Where can you get strong, fire-safe glazing like this? All the leading fabricators of plastic panels carry it—as *fire-retardant grade*. You can buy it under many brand names, but they all have one thing in common—safety. They're all made with Hetron,® the inherently flame-resistant polyester plastic that's so safe it is used in arctic radomes, jet airliners, submarines, and lifeboats.

Be on the safe side when you buy plastic glazing. Say "Hetron"—or specify "fire-retardant grade." It costs a little more. It's worth a lot more. For names of fabricators who can supply you with flat panes or corrugated panels, write us today.

DUREZ PLASTICS DIVISION

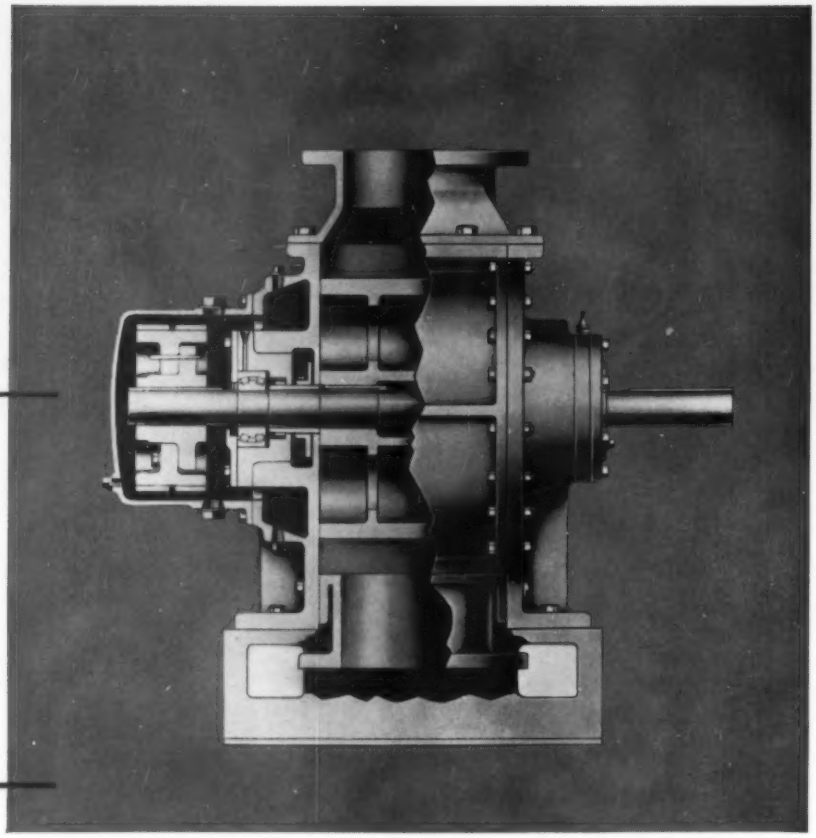
3907 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER CHEMICAL CORPORATION

HOOKER CHEMICALS PLASTICS

Series 400 Blowers are manufactured of close-grain cast iron, reinforced to prevent distortion under severe conditions.

Series 400V, same as above, mounted vertically. Extended bases provided at additional cost, for mounting motor and drive.



NEW "400" SERIES SUTORBILT ROTARY POSITIVE BLOWERS

with oil-free operation and easy-to-adjust timing hub for peak efficiencies

Designed for heavy-duty, continuous delivery of precisely metered air or gas, the new "400" Series Sutorbilt blowers are available in 30 sizes—from 1½ to 40 cubic foot displacement. Because Sutorbilt blowers require no lubrication, compressed air or gas is oil-free—an important feature to food, chemical and other industries.

Easy-to-adjust timing hub lets you re-time the new "400" series right on location. Without removing the unit from the line, you simply slacken hub bolts and remove locking pins from impeller gears to adjust internal clearance. This is accomplished in a few minutes with the Sutorbilt timing hub. No disassembling for adjustment!

Other features of Sutorbilt "400" Series blowers include wideface herringbone timing gears that minimize wear and maintain close impeller tolerances. Impeller shafts turn on four oversize, heavy-duty roller bearings that keep shafts in perfect alignment and lower mechanical friction.

For long, maintenance-free service plus peak, positive pressure through the years, specify Sutorbilt blowers. Write for illustrated brochure S-65C giving complete specifications.

Representatives in principal cities. Consult your Classified Telephone Directory.

SUTORBILT IS WELL BUILT

CORPORATION, 2966 EAST VICTORIA ST. • COMPTON, CALIF.

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FULLER COMPANY GENERAL

1322
S-15

For more facts circle 585 on Reply Card

NEW PRODUCTS

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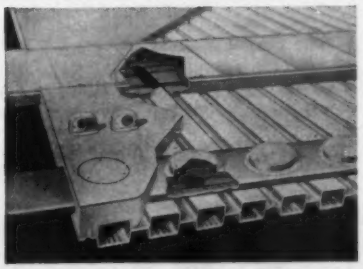
to 40 per cent water. While soak tank cleaning of parts is probably the major application for this product, usefulness in highly alkaline cleaners is also reported, as well as in a bottle-washing detergent compound, and in steam cleaning compounds. Rohm & Haas Co.

23—UNDERFLOOR SYSTEMS with more wiring capacity

These two Headerduct Systems are designed for applications utilizing cellular steel floors as raceways for power and communications conductors. One system, the 15,000 Series, provides 20.294 sq in. of duct capacity. The other, the 14,000 series, offers 9.2 sq in. capacity. Both are 14-gage steel and can be combined in one installation by use of a special connecting device.

The 15,000 Series duct (shown at top of photo) measures 2½ by 10 in.



and has removable aluminum cover plates designed to butt together to form a cover for the duct and also permit ready access to wiring. An aluminum extension on either side provides a screed line for concrete and finish trim for tile. The duct comes in standard lengths of 3 and 5 ft. The 14,000 Series (bottom of photo) is 1⅜ by 7¾ in., available with junction unit spaced on centers from 12 through 120 in. These junction units are designed to permit outside adjustment. The duct comes in 8-, 9- and 10-ft. lengths. A large-capacity cross box is also available with the 14,000 Series. It provides an 11¼-in. opening allowing access to all four duct exits as well as a 3-by-12 in. opening giving access to floor cells. National Electric Div., H. K. Porter Co., Inc.

24—INDUSTRIAL LOTION protects hands 12 hr

Vanfaire is announced for protecting hands exposed to chemicals, oils, grease, solvents, plastics and paint. Applied like any hand lotion, it provides invisible protection for up to 12 hr, is soluble in soap and water. Vanfaire Co.

25—DRAFTING MACHINE works at any angle

Neoglide is designed for use on any board at any angle and without adjustment. Its enclosed counterweight unit provides counterbalancing at all board angles from horizontal to vertical, and the head responds to finger pressure. Neoglide's reinforced U-beam construction offers rigidity, strength and accuracy while retaining simple design. Components are assembled within the U-beam channel, protected from accidental damage or exposure to dust. The drafting machine's major moving parts have quiet, smooth nylon wheels that ride on rigid hidden tracks. There are no adjusting screws or knobs, no springs or belts. Neoglide's protractor head operates on a touch-control method for angle selection. When the control is depressed, the scales rotate to the desired position and lock into place.

This machine can be raised to any height off the board to clear obstructions, change tracings, or brush the board, it is noted, and settings are not disturbed. An advantage cited is excellent board coverage. When the machine is not in use, it can be pushed to one side, leaving the board unobstructed. Installation is simple. Two corner braces fit over the top board corners and are screwed on. One person can install the machine. Neoglide is available to fit standard board sizes. Charles Bruning Co., Inc.

26—MINIATURE SYSTEM for automatic lubrication

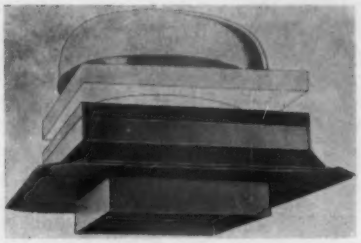
The Micro-Measure System is a miniaturized injector system for lubrication of production machinery. It is designed to pre-measure and inject fluid lubricants to "millionths of an ounce" in automatic cycle as often as every minute. An automatically controlled, air-operated pump supplies lubricants to small, economical injectors with micrometer adjustment—at a predetermined rate, in quantities as small as 1/135 drop. The system is said to maintain a constant, uniform oil film on all bearing surfaces without overflow or dripping. Micro-Measure Bulletin 816 gives information. Lincoln Engineering Co.

27—MOTOR STARTER is key operated manual unit

This key-operated manual motor starter fits standard single-gang outlet boxes. A single-phase 115/230-v starter, it is designed for direct operation of motors up to and including 1 hp. It is available in open or NEMA Type 1 surface-mounted enclosures, and can be had in single- or double-pole design. Like other models in company's 100 Line series of manual motor starters, this one incorporates straight-through wiring and a plug-in heater. One key fits all of company's key-operated forms, and use of the key permits only authorized operation of the equipment. The heater plugs in from the front of the starter. Enclosures for the starter can be furnished with or without a neon indicating light above the toggle switch (no additional wiring). General Electric Co.

28—PREFAB CURB simplifies ventilator installation

The VC Curb Base for roof ventilators is available with automatic or motor-operated louvers, if desired, and can be used on new or old construction. This base fits into a framed roof opening and is nailed, bolted or welded to the deck. The ventilator fits over the curb and fastens to the wood top frame. An extended collar at the bottom of the curb houses the louvers. Of heavy-gage steel with insulated double walls, the curb has a built-in "cant strip" which lends itself to various roofing constructions. Roofing paper can be rolled up the sides of the curb to eliminate hollow spots. The curb comes in 12 sizes for use with company's own ventilators from 16 to 48 in., and these sizes will also fit many ventilators made by other manufacturers. Loren Cook Co.



29—HERBICIDE for non-selective weed control

Prometone 25E is a triazine herbicide for non-selective or industrial weed control in non-cropped areas. A 25 per cent emulsifiable solution, this

Where's the Man in this picture?

HE'S AT SAFE DISTANCE RELEASING THIS LOAD BY PUSH BUTTON CONTROL!

• Think of it! Now you can release "tough-to-handle" loads safely and without help from a follow-up man with the new Acco Solenoid Chain Release. Truly a revolutionary development in material handling, the Acco Solenoid Chain Release is controlled by the crane operator from his cab. Simply by pushing a button, he activates solenoids on the end of a spreader bar which in turn expels the chain from the hooks and releases the load. What if the control button is pressed accidentally or the power fails while the load is in the air? Nothing will happen because load must be on the floor with tension removed from the chain before solenoids operate.

The Acco Solenoid Chain Release is the safe answer to many material handling jobs where conditions make it dangerous for a man to unhook the load. Placing bundles of steel billets in a cooling pit is but one job made far safer by this labor-saving equipment.

The Acco Solenoid Chain Release can be ordered now in single or double spreader bar models. Accoloy X-Weld 125 Chain is normally furnished with both models although other types of chain are available upon special request. Spreader bar is sturdy I-Beam steel. Individual solenoid units without the spreader bar are also available. For complete information write our York, Pa., office.

ACCO Registered

SLING CHAINS

American Chain Division · American Chain & Cable Company, Inc.

Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

*Indicates Warehouse Stocks

ACCO

For more facts circle 587 on Reply Card

NEW PRODUCTS

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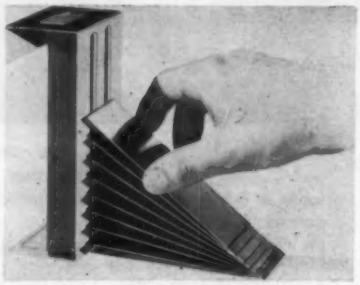
post-emergence herbicide is said to control most annual and many perennial weeds and grasses. It appears promising for control of Johnson and Bermuda grasses. The top killing activity of Prometone 25E, combined with its action through root absorption, makes it most effective when applied within 2 to 3 mo following weed emergence and when there is rainfall to move the chemical into root zone. Geigy Chemical Corp.

Use the Reader Service Cards provided on pages 185-186 to ask for more information on the products. Circle item numbers of products in which you are interested.

30—STEEL SEPARATOR handles small sheets, blanks

The Magni-Mite Separator, for quick, easy separation and removal of small metal sheets or blanks, stampings and other metal pieces, has an enclosed



welded, stainless steel case. Inside elements are protected from damage or possible pilferage, and there are no projecting bolts, screw heads or rivets. Vertical ribs on the magnetic surface offer point contact for positive separation and easier removal, and the top plate extension forms a handle. Magni-Power Co.

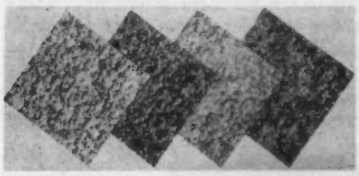
31—PLASTIC FILM has fiber glass reinforcing

Ger-Pak Reinforced Film, of polyethylene reinforced with fiber glass, is light in weight, low in cost and easy to handle; and it is reported to have extraordinary strength and long life. Manufacturer says it will not stretch or bag and it resists rips and tears. Equipment covers and closing-in during construction are among industrial applications for this barrier film. It comes in a 2-by-2 mesh (two

squares per inch) and 4-by-4 mesh (four squares per inch) in 4- and 8-mil thicknesses, in natural (clear) color or sunlight-resistant black. Gering Products, Inc.

32—VINYL ASBESTOS TILE in carpet effect pattern

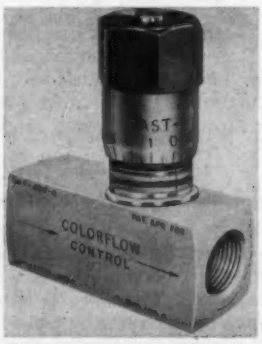
Now in the Vina-Lux line of vinyl asbestos floor tile is a pattern called "Carpet Tones," which can give the nap effect and deep textured look of



carpeting to plant offices, reception areas, etc. Four "oriental" color combinations are offered: a brown and beige nap effect; cream with beige; grey with dark grey; and rose with brown. The pattern comes in standard 9-by-9 in. size, 1/16 in. thickness. Azrock Products Div., Uvalde Rock Asphalt Co.

33—VALVES feature color-coded adjusting scale

In Colorflow Valves, the adjusting scale is composed of easy-to-read color graduations. This is expected to simplify many basic control problems, and to enable even untrained personnel to check the valve setting at a glance, even reset the valve when necessary. The color code consists of a number of permanently colored bands, each a different color. Each



full turn of the screw exposes another color. In addition, the screw is graduated numerically so that the valve can set on red 5, blue 6 etc. Other new features incorporated in the Colorflow include a guided poppet stem to eliminate poppet "cocking" and assure accurate seating, and a needle stop to guard against spring damage. Flow control and needle valves in the Colorflow line come in

Cable-Laid Slings have the Flexibility of Manila Rope, the Strength of Steel!

• Cable-Laid Slings are the most versatile wire rope slings ever made! Flexible...strong...resistant to kinking...free from crankiness—they offer a unique combination of advantages that make them the solid favorites for any lifting application where ease of handling is all-important. Many users report Cable-Laid Slings cut rigging time in half, while others say they outlast standard slings 3 to 1!

The secret of Cable-Laid Slings is in the construction of the wire rope—a combination of six individual wire ropes, not strands, laid around a special steel center. Result: Cable-Laid Slings won't kink—even when used on heavy loads with square corners.

Galacco coating keeps Cable-Laid Slings clean and bright, gives them maximum resistance to corrosion. Patented DUALOC endings double-lock sling ends for double security.

And, of course, Cable-Laid Slings are *Registered* Slings. This means that each sling is proof-tested at twice the load-carrying capacity for which it is rated. Then, and only then, does it receive the ACCO tag and certificate of registration.

Get the details on Cable-Laid from your nearby distributor—or write us at Wilkes-Barre, Pa., for **Folder DH-532** giving strengths and weights on a full range of Cable-Laid Slings.

ACCO Registered
WIRE ROPE SLINGS

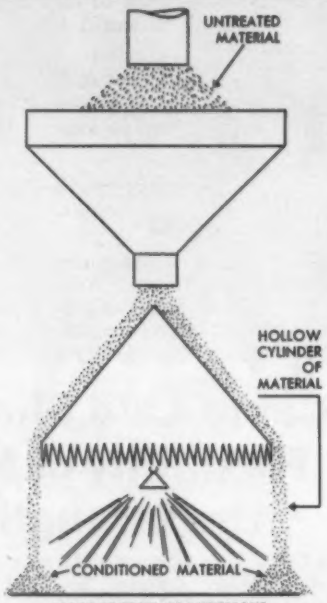
Wire Rope Sling Dept. · American Chain & Cable Company, Inc.
Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.
In Canada: Dominion Chain Company, Ltd., Niagara Falls, Ontario

ACCO

For more facts circle 588 on Reply Card

NEW JOHNSON MARCH VERTICONE

...for dust-free unloading and materials handling



CROSS SECTION OF VERTICONE SHOWS PRINCIPLE OF OPERATION

THE VERTICONE PRINCIPLE OF DUST CONTROL

1. ***dispersion of materials*** Dusty material flows by gravity over a distributing cone and falls as a thin walled hollow cylinder.
2. ***controlled wetting*** Application of less than 1% moisture containing Compound MR, a powerful surface active compound, effectively wets all surfaces of material particles for dust-free handling.

The Verticone conditioner developed by Johnson-March provides the first practical low cost method of controlled wetting of dusty materials to permit dust-free handling.

new low cost fly ash conditioning

- Lower first cost than other methods
- Lower operating cost
- Less than 1% moisture
- Permits bagging for profitable disposal

For full information on the new Verticone write today for Bulletin V-100.

JOHNSON MARCH Dust Control Engineers
3018 Market St., Philadelphia 4, Pa.

CANADIAN REPRESENTATIVE: G. F. Sterne and Sons, Ltd., Brantford, Ontario

For more facts circle 589 on Reply Card

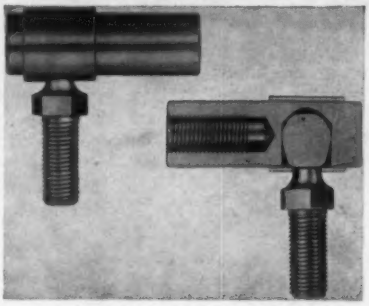
NEW PRODUCTS

(Begins on page 144)

five standard sizes from ⅛ to ¾ in. Standard models withstand pressures to 5000 psi. The Manatrol Corp.

34—BALL JOINT has fewer parts, is stronger

Fewer parts, greatly extended service life, greater strength and costs ranging 40 to 75 per cent lower than many more complex joints used for comparable purposes are announced for SP Joints. Available in broad line of sizes, they have a redesigned ball which departs from the conventional



spherical shape and which features a shorter, heavier neck. Greater strength and better wear characteristics are obtained without sacrifice of angular deflection in any direction, it is stated, and movement is free at any point in a minimum conical angle of 30 deg regardless of the plane of deflection. The female part has also been redesigned. In its entirety, this assembly consists of two parts—joint body and a spring steel retaining sleeve. Manufacturer of this ball joint states that its design eliminates adjustable parts because materials and shape configuration of the ball provide ample performance improvement. Superior Ball Joint Corp.

35—BEARINGS operate over wide range of conditions

These oilless bearings are made of Arguto-MP. According to company, this material is formulated as an alloy of plastics in which each ingredient performs a particular bearing function, or imparts specific physical properties. Arguto-MP Bearings are claimed to provide a combination of high load carrying capacity; low coefficient of friction and excellent heat dissipation; wide ambient temperature range (—250 to 375 F); low thermal expansion; low water absorption; good resistance to corrosion and abrasion; excellent wear properties in a broad range of speeds and loads, and continued operation

Hall Industrial Water Report

VOLUME 7 JULY 1959 NUMBER 4

More International Trouble

Industrial water problems know no geographical boundaries: They are as prevalent and troublesome in Europe and Asia as they are in North or South America. And, no matter where they arise, they require expert handling. This is why calls for Hall Laboratories services come from all over the world. Hall engineers are able to solve some of the problems by correspondence, but travel halfway around the world to tackle others on the spot.

The problems themselves are no different because they occur in Saudi Arabia or Chile. Each offers its unique combination of factors, and the Hall engineer uses his training and experience to decide what is significant and what practical steps must be taken.

Power for India

Water conditioning for a 150-megawatt power station in India was started more than five years ago and successfully controlled entirely through correspondence.

When the high-pressure unit was ready for operation, Hall engineers had already set up a complete program of water and steam conditioning to avoid water-connected trouble in any part of the station. They established the chemical conditions to be maintained in water throughout the plant. They specified the analytical procedures and equipment required for control, the necessary conditioning chemicals and how to feed them. They outlined in detail the mechanics of operating the clarifying and zeolite softening equipment for treating evaporator feedwater.

The operators carried out the program to the letter. Progress was followed through water conditioning reports and analysis of water samples submitted on a fixed schedule.

One problem did occur. Scale composed of mica and iron oxide was found in several water wall tubes of one boiler the first time it was inspected. Investigation revealed that the mica came from mud which got into the tubes before they were installed. Furthermore, these tubes had been damaged in transit; repair by welding and heating with blow lamps produced some iron oxide.

The general superintendent of the plant wrote to Hall Laboratories, "I wish to take this opportunity to thank you for the valuable help you have rendered us during the initial operation of this power station."

Costly Boiler Outages

Deposits caused numerous annoying and costly tube failures in the 625-psig boilers generating steam for power and process at an oil company installation in Arabia. Analysis showed the deposits to be composed principally of iron oxide but to contain significant amounts of magnesium phosphate.

Hall engineer A. M. Henricks made a complete survey of the plant. He established the source of the iron oxide to be corrosion in the condensate system. He recommended the use of a filming amine (Hagafilm®). This effectively reduced accumulation of iron oxide in the boilers. Test specimens showed a reduction in corrosion rate of about 90%.

The magnesium was traced to evaporator carryover. Changes in internal baffling and increased blowdown to hold evaporator water solids at a lower level effectively reduced the carryover.

Five years have passed. Boiler deposits are not a problem and tube failures no longer occur.

Superheater Tube Corrosion

Operators of a utility plant in Jamaica were surprised to find active pitting in the inlet and outlet superheater headers of a boiler which had been in service for several years. Their surprise was natural because recommended water conditions had been continuously maintained both when the boiler was operating and when it was idle.

The nature and location of the corrosion convinced the Hall engineer assigned to the job that the pitting had occurred when the boiler was idle. He discovered that when the boiler was prepared for wet standby, the water was properly treated but the superheater was not completely filled. This left the superheater headers full of moist air—an ideal condition for corrosion.

The headers were thoroughly cleaned and changes were made to insure complete filling during idle periods. After more than two years there has been no further attack.

Globe Trotters

Hall service is available through thirty-five local offices in the United States, Mexico and Canada. Consultation and service on water problems take Hall engineers to many other parts of the globe. Regular trips are made to Colombia, Venezuela, Haiti, Dominican Republic, Puerto Rico, Jamaica, Newfoundland and Cuba. Occasional visits are made to such faraway places as Saudi Arabia, England, Italy and Pakistan. And plants in some other countries like Chile, Argentina, Brazil, France and India have been successfully helped with their water problems by correspondence only.

Let us know if we can help you make water behave properly in your foreign installations.

Water is your industry's most important raw material. Use it wisely.

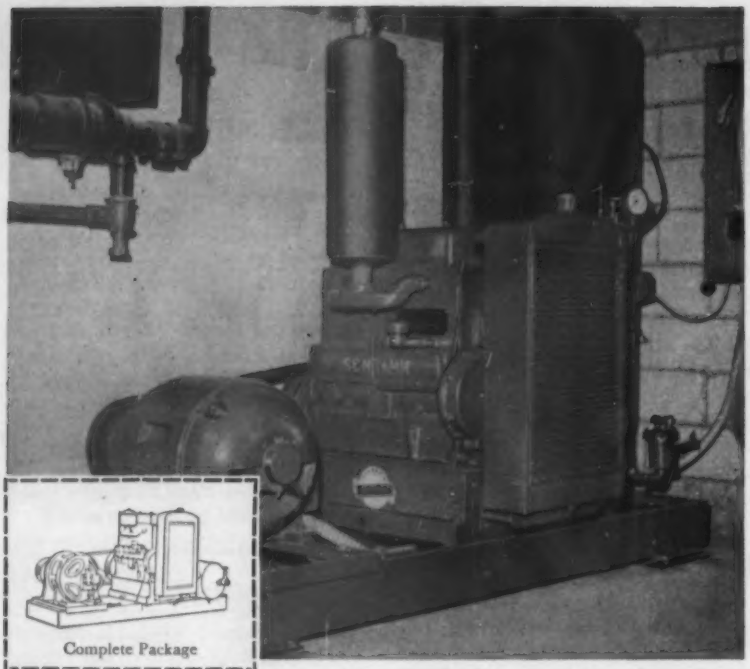
Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information on how the Hall System can help you solve your particular water problems, write, wire or call address below.

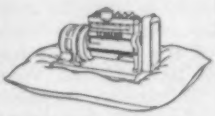
HALL LABORATORIES
DIVISION OF HAGAN CHEMICALS & CONTROLS, INC.
HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto

Hall Laboratories—Consultants on Procurement, Treatment, Use and Disposal of Industrial Water

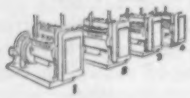
For more facts circle 590 on Reply Card



Complete Package

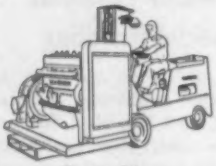


No Vibration

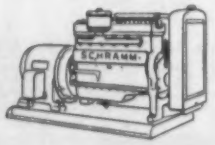


Unit System

No Elaborate Foundations



Easy to Move



Compact

COMPLETE PACKAGE

Install or move Schramm Compressors anywhere

Compact, easy-to-move Schramm Compressors give you air wherever you need it. Install your compressor anywhere in the plant. Take advantage of unused corners. Relocate to meet emergencies or changes in production plans. Shorten air lines by moving compressor right to the job. Or make it a part of a *unit system*—adding or removing compressors to meet air requirements.

No Vibration—balanced reciprocating parts provide smooth operation, lengthen compressor life.

Unit System—no need for costly centrally located compressors and long air lines. Use only the compressors you need—add to them as requirements grow.

No Elaborate Foundations—eliminate this added cost with a vibration-free Schramm installation.

Easy to Move—change the location of your compressor whenever you need.

Compact—takes less space—put your Schramm compressor anywhere—take advantage of unused corners.

For complete information, write for Catalogs GC-57 and 5510, or see your nearest Schramm Dealer.

See the Yellow Pages for local Sales, Service and Rental of Schramm Air Compressors.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

665 North Garfield Ave. • West Chester, Pa.

For more facts circle 591 on Reply Card

NEW PRODUCTS

(Begins on page 144)

without re-lubrication. The bearings are molded to any shape, machined to close tolerances, it is stated; will not cold flow or melt. Bulletin 501 gives details. Arguto Oilless Bearing Co.

36—CLEAR PLASTIC covers metal mesh slings

For sling applications where freedom from damage to surface of the load during handling is imperative, manufacturer of Gripper Slings introduces a clear polyvinyl chloride covering for them. Its clarity permits inspection of the metal mesh fabric at any time to

determine condition of the fabric itself. The covering is applied by a molding process that produces a smooth, rectangular shaped covering around the entire body of the sling. It increases the thickness of the sling by about ⅛ in. on both sides. Covered Gripper Slings are also suggested for use where corrosive acids are present. The Cambridge Wire Cloth Co.

37—METERING PUMP is durable, low in cost

Model CM is introduced for metering clear and corrosive liquids to chemical processes. This economical, controlled volume pump is intended for metering situations requiring low-cost durability with accuracy. Model CM delivers

maximum capacities to 28 gph in simplex designs, and double that gallonage in duplex designs (two liquid ends with common motor and base). The pump is designed to handle pressures to 1100 psi. Model CM features sim-

BEFORE YOU GROUT ANOTHER PIECE OF HEAVY EQUIPMENT

FREE 8-PAGE BOOKLET . . .
with full details on applications, advantages and specifications for the use of non-shrink EMBECO Pre-Mixed Grout. Write for your free copy.

. . . get all the facts about EMBECO Pre-Mixed Grout in this fact-filled grouting guide.

EMBECO Pre-Mixed Grout provides these exclusive "built-in" benefits for a superior grouting job everytime.

NON-SHRINK—assures tight, level contact with equipment bedplate . . . gives full support.

FLOWABLE—increases placeability . . . quickly and easily fills the space to be grouted.

STRONG—resists impact . . . tough . . . maintains alignment. No costly downtime for re-grouting.

READY-TO-USE—simply add water and mix for a superior grout that means outstanding results.

EMBECO Pre-Mixed Grout eliminates possible errors in selecting and proportioning ingredients. Saves you important hours and dollars in re-grouting—because EMBECO *grouts for good.*

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The Master Builders Co., Ltd., Toronto 15, Ontario • International Dept., N. Y. 17, N. Y.
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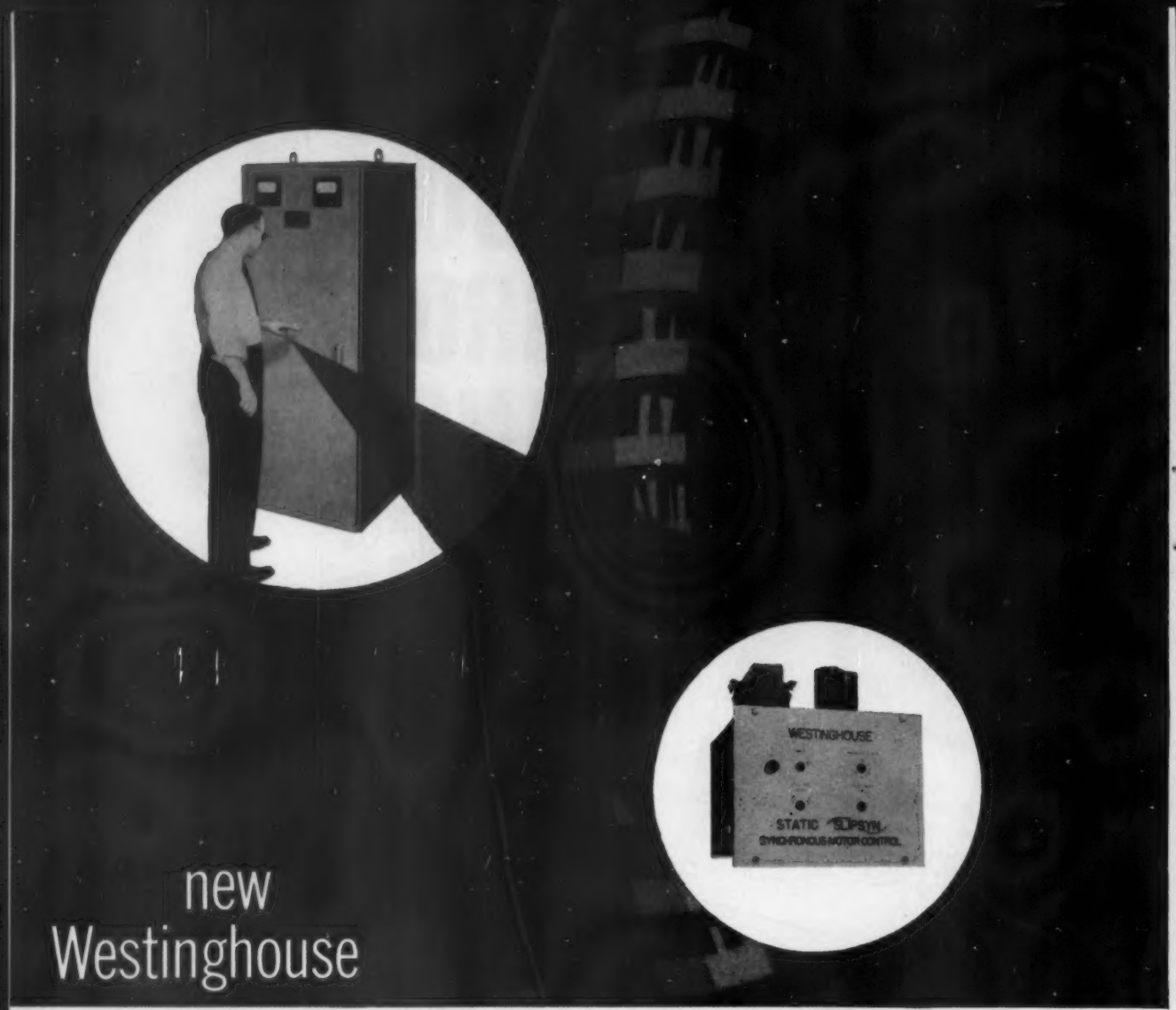


new
Westinghouse

static Slipsyn control for synchronous motors

more reliable...
unaffected by contaminants...
reduces maintenance

Here's a new control for synchronous motors which can practically pay for itself in greater reliability and less maintenance. It's the all-new Westinghouse static Slipsyn® control.

Because conventional relays have been replaced with simple, reliable, transistorized networks, there are no moving parts . . . no contacts, bearings and springs to erode, wear and fail. This means that maintenance is practically eliminated. It also means that your control is unaffected by contaminated, dusty atmospheres.

In addition, new Westinghouse static Slipsyn control offers you these important operating advantages: Field application can be accurately controlled between the range of 90 to 99 percent of synchronous speed . . . pull-out protection is positive and adjustable between one and eight cycles of slip . . . and the size and weight of the field application control are greatly reduced.

Ask your nearby Westinghouse salesman to show you exactly where and how new static Slipsyn control can put extra savings and help you Power-Up for more profit. Or, write to Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania, for complete printed information. J-22146

YOU CAN BE SURE...IF IT'S Westinghouse

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV MONDAYS

For more facts circle 593 on Reply Card

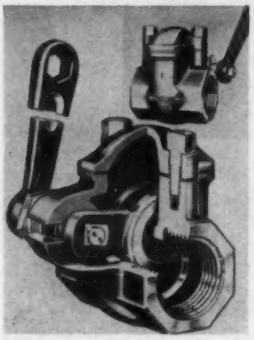
NEW PRODUCTS

(Begins on page 144)

plified construction. Plungers are interchangeable within the pump frame, and models can be converted in the field from simplex to duplex capacity. The pump utilizes a standard ½-hp drive, constant speed electric motor through a right-angle gear reducer. The motor is an open, drip-proof, single-phase, 115-v, 60-cycle unit. Materials include steel, 316 and Milroy stainless steel. Milton Roy Co.

38—GATE VALVE offers quick, easy operation

Redesigned Bronze Quick-Opening Handy Gate Valve, Fig. 430-58, is announced as providing tight shut-off against flow from either direction, yet affording quick and easy operation. It



has a ball-and-socket joint between self-adjusting faces, and a deep stuffing box seals the operating stem. End-to-end dimensions are unchanged, maintaining the valve's interchangeability. The cap is bolted down with two cap screws to facilitate disassembly. Available in sizes ½- through 4 in., these valves are rated 75 lb steam pressure for water, oil or gas and are suggested for installations where quick operation is required to handle water, oil and low pressure steams. The Lunkenheimer Co.

39—AFTER COOLER for compressed air and gas

Improved models of the Aero After Cooler, for cooling and drying of compressed air or compressed gases, are announced as giving increased capacity in more compact equipment because of improved cooling and manifold design. These machines obtain the cooling and drying effect by evaporative cooling of compressed air passing through tube over which a water spray is partially evaporated. Heat of compression is rejected out of doors in an air stream passing

3.*
DAYLIGHTING DO's and DON'Ts
FOR SAFETY-CONSCIOUS ENGINEERS

* No. 3 of a series to help Engineers increase plant efficiency and economy.

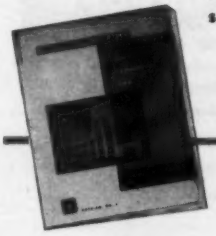
DON'T expect fire and breakage protection from ordinary window glass.

Only glass containing wire mesh qualifies as a fire retardant and enjoys recognition in most state and municipal codes as a safety factor in glazing openings in windows, skylights, partitions, exit doors and other vital areas in buildings.

DO EXPECT MAXIMUM SAFETY and PROTECTION FROM MISSISSIPPI WIRE GLASS . . .

the glass that helps "bottle up" fire . . . the original solid wire glass that is today the standard by which all others are judged.

Available in obscure patterns and polished for clear vision wherever quality glass is sold.



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MISSISSIPPI GLASS COMPANY
88 Angelica St. • St. Louis 7, Missouri
NEW YORK • CHICAGO • FULLERTON, CALIFORNIA

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

For more facts circle 594 on Reply Card

● First, use Anderson Quik-Flex thermostatically designed steam traps. These traps have no pockets in which water will collect and freeze. An open pipe on the discharge side provides constant drainage and eliminates any maintenance during freezing temperatures.

Second, use a cooling leg of at least three feet. Thermostatic traps operate on temperature differential, and sufficient piping must be provided for the condensate to cool.

Third, install the strainer in a down position. Strainers in horizontal positions collect condensate which freezes and breaks the strainer body during cold weather.

Anderson Quik-Flex Steam Traps are built especially for outdoor service. Guaranteed freeze-proof for two years, they provide a lifetime of trouble-free, freeze-proof draining of condensate from steam lines. Mail coupon for complete details.

A TRAP FOR EVERY PURPOSE

THE V. D. ANDERSON COMPANY
division of International Basic Economy Corporation
1939 West 96th Street • Cleveland 2, Ohio

Please send without obligation your catalog describing Anderson freeze-proof Quik-Flex Thermostatic Steam Traps.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

ANDERSON QUIK-FLEX

For more facts circle 595 on Reply Card

NEW PRODUCTS

(Begins on page 144)

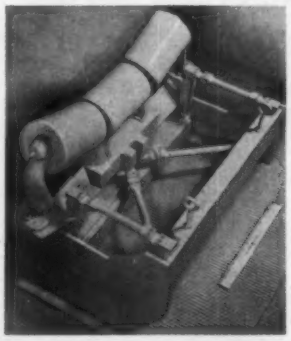
through the spray chamber. Compressed air is cooled to a temperature approaching that of the ambient air to assure no further water condensation in compressed air service lines.

The operation is controlled by an air by-pass and recirculation system that varies the amount of outdoor air passing through the spray chamber, adjusting capacity to the load and protecting the sprays from freezing in winter. New models include a trap in the manifold to remove condenser water. The after cooler comes in nine sizes with a range of free air capacity from 200 to 12,000 cfm. matching compressor sizes from 40 to 2500 hp. Manufacturer states that cooling water consumption is less than 5 per cent of that used in direct-surface-contact methods. Niagara Blower Co.

Reader Service Cards on pages 185-186 make it easy to get further information on any of these products. Just circle the item numbers of the products you would like to know more about.

40—ELECTRONIC SCALE for use on belt conveyors

This continuously totalizing scale mounts between strands of a standard flat or troughed belt conveyor from 14 to 72 in. wide. Simple in design, the scale utilizes an electrical trans-



ducer to convert instantaneous load weight into proportional voltages for continuous integration and digital display. In operation, the flexure wishbone assembly restrains scale idler in horizontal movement permitting only vertical weight displacements to be measured. Static hyteresis record is claimed near perfect and system accuracy high. Adaptable to existing

Contact tips hold up "like new" after one year's service to keep your maintenance down

The unretouched photograph above shows two sets of contact tips from a Clark Type "CY" A-C Motor Starter. One set has seen a year of continuous hard service with frequently as many as 5,000 operations per hour. The other set is brand new—unused.

Which contact tips were actually in service for one year? The obvious, but not too obvious clue is the slight discoloration and minute pitting in the tips at right above.

But you can easily see for yourself that even after one year of steady operation these tips show very little evidence of wear. Their present condition will assure many more years of dependable service, free of maintenance.

The secret? Clark's exclusive "arc quenching" principle incorporating the use of strong, multi-turn magnetic blowouts and double-break contacts.

The action of the magnetic field not only forces the arc to rotate, moving it continually over contact surfaces, but tends to "quench" it at the same time. Result: Less wear on contact tips and fewer maintenance headaches.

There are many more good reasons why the Clark Type "CY" Starter is your best *preventive* maintenance buy. For complete details contact your nearest Clark Controller sales office or distributor. Or, write direct. 681

The CLARK CONTROLLER Company

Everything Under Control • 1146 E. 152nd St. • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

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SEE FOR YOURSELF HOW

OSPHO®

PREPARES RUSTED METAL FOR PAINTING...

Brush or spray OSPHO directly on rusted metal. Let dry overnight.
Test the hard surface that results — the perfect base for paint.

Send for FREE Test Sample

Eliminate sand-blasting or flame-cleaning. Simply brush off loose rust and apply OSPHO on the rusted metal surface. One application *kills* the rust and provides a *sound* base for your regular maintenance paint. Rust action is stopped — paint jobs last much longer.

OSPHO is *not* a primer — *not* a paint. It is a carefully balanced phosphate chromate metal treatment which chemically changes rust (iron oxide) into iron phosphate — an inert, hard, gray surface ideal for painting.

OSPHO provides excellent coverage . . . a gallon treats up to 600 square feet. And cost is low. Available in 1-gallon containers (in cases of 4), 5-gallon pails, 50-gallon barrels. Colorless, non-toxic, non-flammable. Available through distributors.

Repeat orders over the past 16 years are proof of OSPHO's effectiveness. *See for yourself . . .*

Write Now For FREE Test Sample
(on company letterhead)
and descriptive literature

TREATS NEW METAL TOO!
When applied on new ferrous metal, galvanized iron and aluminum, OSPHO imparts a slight etch to the metal, insuring tight bond of the paint coat that follows.

ONLY OSPHO KILLS THE RUST

RUSTICIDE PRODUCTS COMPANY
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For more facts circle 597 on Reply Card

NEW PRODUCTS

(Begins on page 144)

equipment, the scale is suggested for simple weighing processes, proportioning, feeding and physical sampling systems. Bell Automation Corp.

41—TEMP REGULATOR is self-contained device

VU 82 Temperature Regulator for proportional control of water, gas or low pressure steam is designed for applications where a self-contained valve assembly may be particularly suited. It offers installation advantages of a

self-contained controller, with additional features of a clearly marked calibrated adjusting dial, an electric industrial motor operator, and armored capillary tubing. Typical applications include package air conditioning units, hot water storage tanks, plating tank control, industrial process control. No assembly, linkage or adjustment is necessary before or after installation, company points out, except for setting the control dial to desired temperature. It uses a simple two-wire connection to almost any available power supply. Data Sheet F-9310 provides engineering data. Barber-Colman Co.

42—TIME SWITCH, 40 amp, tungsten-rated

Significant development of the 4000 Series of time switches is 40-amp tungsten rating, said to provide highest capacity available in general purpose low-cost time switches. They are intended for all lighting applications from incandescent to neon, and for use with pumps, blowers, motors, heating and air conditioning, signal systems and other industrial uses. The 40-amp rating is claimed to eliminate troubles caused by "contact welding" and to introduce a new concept in switching mechanism with free-floating make and break contacts.

Other features incorporated include a "snap-out" movement, and a spring

how INLAND STEEL uses GLOBE INTERCHANGEABLE TRAYS

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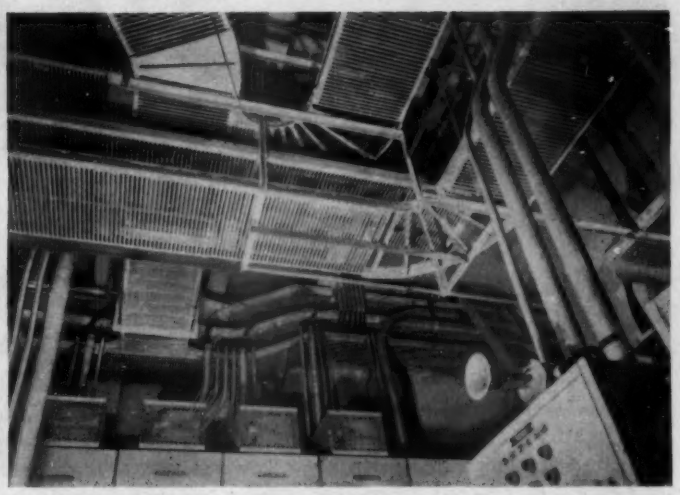

Globetray Pat. Pending

LADDER TYPE

BASKET TYPE (One-piece construction)

Globe's two types of cable trays, one a ladder type and the other a basket type, to support cables, wiring and tubing have become increasingly popular because they can be used INTERCHANGEABLY at any given location depending on the type and weight of the cables to be suspended. The advantages of each type tray can be used to the fullest. Globetray, the ladder type, is intended for use where festooning is not a problem, while Cable-Strut, the basket type, is used for the support of communication wire, instrument tubing and control cables in automation applications.

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Division of ANCHOR POST PRODUCTS, INC.®

For more facts circle 599 on Reply Card

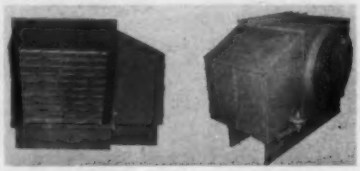
NEW PRODUCTS

(Begins on page 144)

clutch to allow free dial movement for checking "on" and "off" switching operation. The quick-set dial uses easy-add trippers, and is calibrated in 15-min sections, subdivided into 6-hr quadrants — morning, afternoon, evening, night. For skip-a-day applications an omitter device is available. Unit uses a heavy-duty industrial type synchronous motor. Paragon Electric Co.

43—INTAKE AIR UNITS are direct-gas-fired

These direct-fired intake units are claimed to offer almost 100 per cent combustion efficiency for supplying tempered outside air to replace air removed by industrial exhaust systems. Economy is achieved by burning natural or propane gas in a line-of-flame burner directly in the entering air-



stream. Products of combustion are mixed with large volumes of fresh outside air to avoid possibility of contaminating air in the building. Basic models are rated at 2, 4 and 6 million Btu/hr, with air volumes of 25, 50 and 75 thousand cfm. They may be installed on the roof or in a wall opening, and used with or without duct system for air distribution. Standard models have a propeller fan in the airstream; external mounting fans can be supplied. Hartzell Propeller Fan Co.

44—COATING puts non-skid surface on floors

Kon-Kote is announced as providing high-impact strength, corrosion resistant, safe and maintenance-free floor surfaces. It is suggested for warehouse floors, ramps, walkways, entrances and other areas subjected to hard usage, and its chemical resistance makes it suitable where corrosion is a problem. Kon-Kote is supplied as three components to be mixed on the job and then troweled on from 1/16 to 1/2 in. thick. The coating bonds to a variety of materials from concrete to steel, may be brushed to degree of roughness desired for non-skid protection. The surface is non-porous, non-absorptive and non-dusting, it is stated, and resists many chemicals, solvents, including 50 per cent concentrations of nitric, sulphuric, hydrochloric and citric acids. Kon-Kote

FOAMGLAS® INSULATION / waterproof, vapor-proof, strong, can't burn, acid-proof, vermin-proof, dimensionally stable

AT ROHM & HAAS CO.—

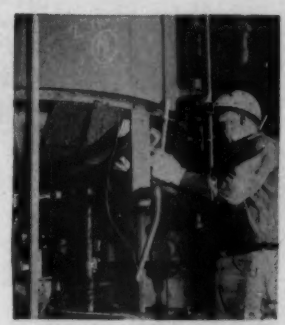
10 year maintenance-free service record backs choice of **FOAMGLAS®** insulation here

Ten years ago, Rohm & Haas Company picked FOAMGLAS to insulate all piping and equipment in a huge new industrial chemicals plant the company built in Deer Park, Texas. Since that time, they've had virtually no insulation maintenance—and the insulation serves as effectively today as when it was installed.

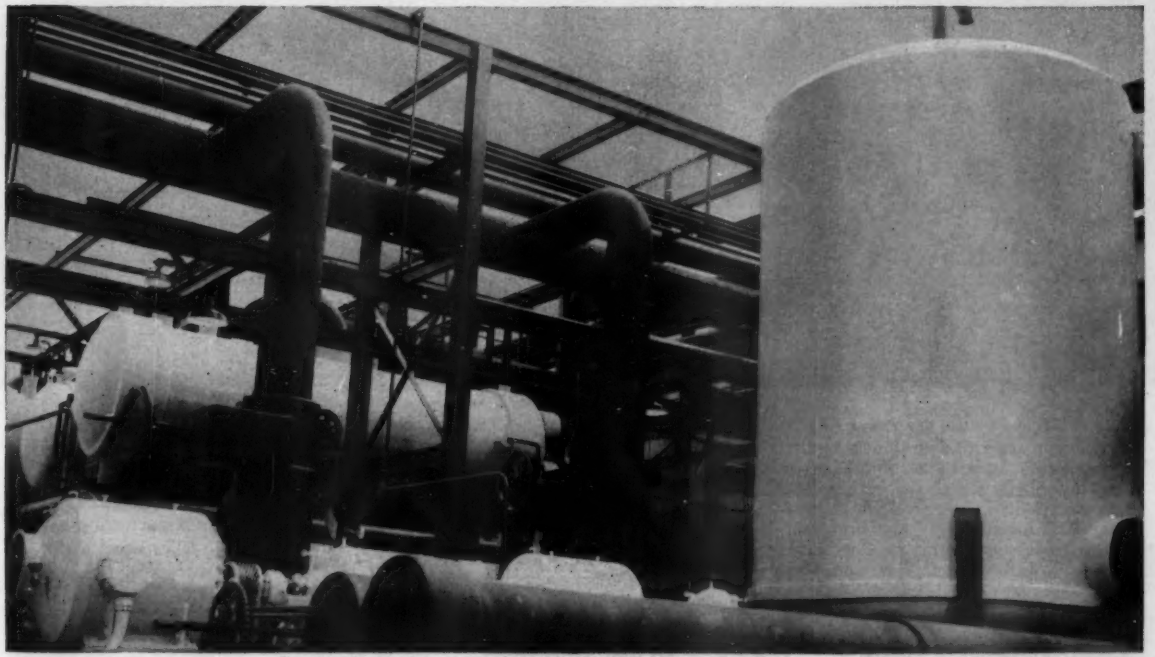
That service record led R & H to pick FOAMGLAS to insulate all piping and equipment for the Deer Park plant's new low temperature processing unit (pictured below).

What makes FOAMGLAS such an effective industrial insulation? This unmatched combination of benefits: FOAMGLAS seals out all moisture to insure insulating efficiency that cannot vary. It is acid-proof. It can't burn. It's quick and easy to install and needs little or no maintenance.

Next time you face the problem of insulating piping or equipment, let Rohm & Haas' experience be your guide. Pick FOAMGLAS. Complete information on this unique cellular glass insulation is contained in our new industrial insulation brochure. To get your free copy, write Pittsburgh Corning Corporation, Dept. PE-79, One Gateway Center, Pittsburgh 22, Pennsylvania. In Canada: 3333 Cavendish Blvd., Montreal, Quebec.



Lightweight, easy to cut and shape, FOAMGLAS saved installation time and money for Rohm & Haas. Installation by the Aber Company.

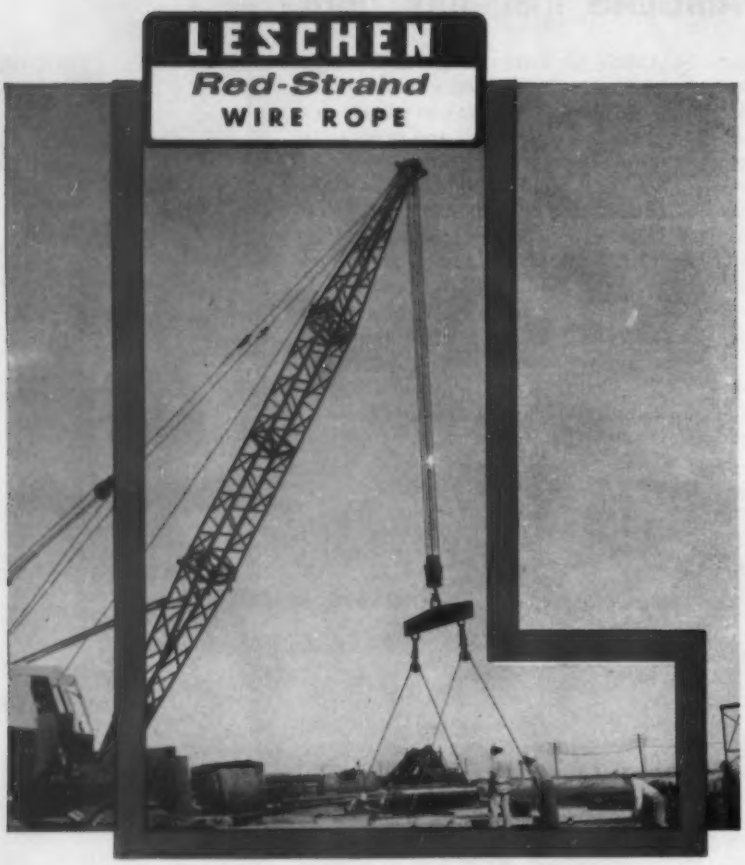


Proof against moisture, fire and acids, FOAMGLAS eliminates insulation maintenance on this R&H process unit.

PITTSBURGH pc CORNING

For more facts circle 600 on Reply Card

when the going gets rough-
give 'em "L"



When the load is on the crane, you'll be glad you rigged with *Leschen*—the wire rope that's the same top quality in every foot of every reel. The new Leschen wire mill is designed to deliver exactly that. New machines . . . new processes . . . exclusive new continuous-flow technique—all as modern as tomorrow. Try Leschen Red-Strand Wire Rope now and see how its uniform quality makes your operation safer, your replacement time farther in the future. Make your next order Leschen! *Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Mo.*

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NEW PRODUCTS

(Begins on page 144)

is claimed to have greater impact strength than concrete, three times its abrasion resistance. Two formulations are available. Kon-Kote 1 offers superior chemical resistance, and Kon-Kote 2 has slightly greater impact strength. Grant Chemical Co.

45—CELLAR DRAINER has top side suction

For use with sumps of 12-in. diam or larger, the Fig. 3880 Drainette offers top side suction. Positioning of the suction strainer in the top of the casing is designed to eliminate possibility of impeller clogging from debris ac-

cumulating in the bottom of the sump. The submersible ⅓-hp, 115-v, 60-cycle a-c motor weighs 25 lb and has a built-in switch and attached three-prong grounding plug. Corrosion resistant drainer has brass casing and base. Semi-open impeller and strainer are of corrosion resistant Byrite. Pumping capacity depends on vertical distance or elevation from bottom of the pump to highest point in discharge plus pipe friction. At 10 ft the unit pumps 2400 gph; 15 ft, 2000 gph; 22 ft, 960 gph. Goulds Pumps, Inc.

46—IMPACT WRENCH packs more power per pound

Rated capacity of 1¼ in. and increased power per pound are announced for the compact, air-powered 189-B Wrench. It weighs 20⅞ lb

For more facts circle 602 on Reply Card →

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Get rid of the "guns" that "misfire"

His grease guns are aimed at your profits; they can help boost them — or eliminate them altogether. Here's why:

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to our readers . . . .

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8	What It Costs to Modernize Small Industrial Power Plants—24-page reprint of series of articles by H. D. Fisher from 1957 issues, giving six case studies of plants from 25,000 to 50,000 lb of steam per hour capacity.	1.00
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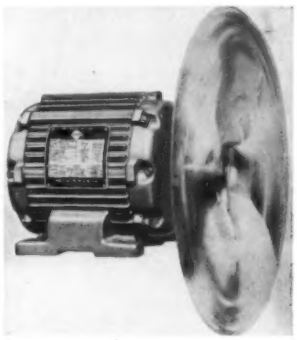
NEW PRODUCTS

(Begins on page 144)

without dead handle and is 13¾ in. long excluding square drive. Manufacturer says this wrench is engineered to require little maintenance, and its fast-starting air motor cannot burn out from overloading. The standard model has a 1-in. square socket driver. Spline drive and accessory equipment are available. Gardner-Denver Co.

47—MOTORS for the air moving installations

Air-Over Fan Motors, 1 to 125 hp, are designed for quiet operation in ventilating systems, exhaust systems, cooling towers and other air moving installations where a motor drives a propeller or axial flow fan. Motor design makes use of air circulated in these installations to cool the motor



so that maximum horsepower can be produced from a minimum motor size. It is pointed out that in the overall design of air moving installations, this permits use of a smaller, lighter motor for any desired horsepower capacity. Individual motor nameplates indicate three hp ratings (nominal, operating and maximum) that can be achieved by varying air velocity across motor. These motors are available with foot or flange mountings, in totally enclosed and explosion-proof enclosures, for vertical or horizontal mounting. Bulletin 2950 gives details. The Louis Allis Co.

48—SYNTHETIC SLINGS are lighter, flexible

Of nylon and Dacron webbing, Du Mor slings are announced as offering high flexibility, great strength and light weight. The flexible webbing conforms to the shape of the load and bends across the length of the sling, company explains, and the wide bearing surface also provides better load balance and gripping power, particularly in lifting hard-to-handle items such as round,

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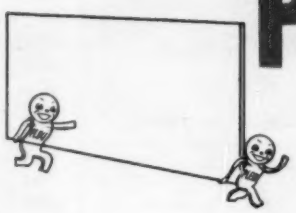

It pays to call an Authorized PLEXIGLAS® Dealer when you need plastics. Why? He provides complete service on PLEXIGLAS acrylic plastic, other plastics and a wide range of accessory products. He gives prompt delivery, and is qualified to help you with fabrication and technical information. And your Authorized Dealer has a stock that includes almost any size and thickness of PLEXIGLAS—clear and colored sheets . . . patterned, corrugated and extruded sheets. He is listed under PLEXIGLAS in the Plastics section of telephone directories in major cities.

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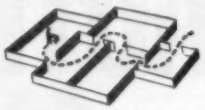
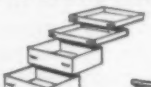
FOLLOW THIS MAN!

He's saving time with a new **Snap-on** *Tool Truck*

Up a stairway on a hurry-up job, nothing to it with the big, 10-inch diameter, semi-pneumatic balloon tires. Emergency repair work across the plant,  compact Tool Truck carries full tool selection to the job. Job in another building, the Tool Truck eases heavy loads over rough pavements or tracks. Drawers are held shut during travel by a padlocked bar.

The new *Snap-on* Tool Truck is invaluable wherever tools or parts transport is needed. Plenty of tool space with four husky drawers.  Upper panel section is partitioned for nuts, bolts, parts. Ample storage space throughout.

A demonstration will prove the Tool Truck's money-saving ability. Call your nearest *Snap-on* branch or write us direct.

SNAP-ON TOOLS
CORPORATION
8068-G 28th Avenue • Kenosha, Wisconsin

For more facts circle 605 on Reply Card

NEW PRODUCTS

(Begins on page 144)

square, hex or flat steels. In many cases the lighter weight and ease of handling of these slings makes it possible for one man to rig loads ordinarily requiring the services of two men, according to manufacturer. Columbian Rope Co.

49—3-WAY LAMP has color corrected light

Model LC-1 Combo is a three-way lamp combining incandescent and fluorescent light in one fixture. Either type of light can be used individually or in combination. A brighter lamp, its light output is 500 ft-c at 12 in.,

using a 60-w bulb and one 22-w Circline T9 fluorescent tube. Spring-balanced action is a feature. With a touch of the finger tips the lamp adjusts to any position and stays put. It can be raised, lowered, tilted or turned to any angle to put the lamp where you want it. Model LC-1 Combo has two extension arms, 360-deg. sweep and 45-in. reach. Grey, green and tan colors are offered. Luxo Lamp Corp.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 185-186.

50—DEODORANT kills odors, is odorless itself

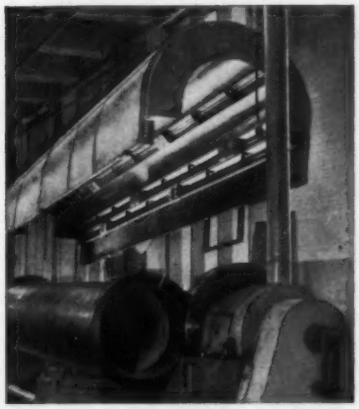
NCG Odorless Deodorant does not have a masking scent and does not paralyze the sense of smell, manufacturer announces; it works by fixation, a chemical reaction with the odor itself to result in absorption of the odor. It is suggested for use in food processing plants, warehouses etc.; and tests are reported to show it effective even in a

HOW CHROMALOX ELECTRIC HEAT helps make it... and make it work

...the U.S. Navy's new Mark 32 fibre-glass torpedo launcher

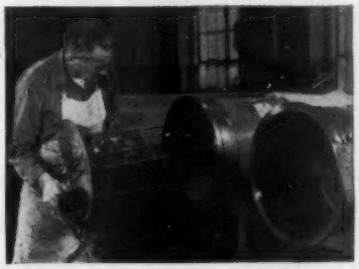
From its unlikely beginning as a fibre-glass mat . . . to its successful operation in sub-freezing sea spray . . . the Mark 32 torpedo launcher testifies to the versatility and dependability of Chromalox electric heat. Designed and built by Apex Reinforced Plastics, division of White Sewing Machine Corp., this lightweight, corrosion-resistant launcher is now in service on Navy destroyer escorts.

In early production stages, a Chromalox-heated hood is used in centrifugal molding of the launcher tubes.



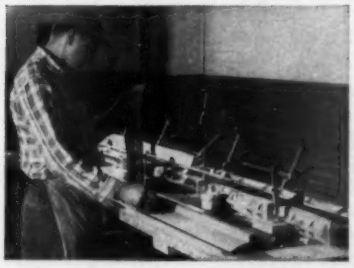
First, a rolled fibre-glass mat is placed inside the mandrel, which is then engaged in spinning motion at 800 rpm. After thermosetting resin has been sprayed into the mandrel, the hood is lowered into position for heat curing. The Chromalox type RAD Far-Infrared Heaters have a total capacity of 36,600 watts, and work reaches approximately 200°F. in about 45 minutes. The hood remains on a total of about 3½ hours, throughout the spinning operation.

Before final assembly, each tube must have steel "nut bars" and "guide bars" cemented to its interior. (Nut bars connect the three tubes into one assembly; guide bars guide torpedoes into each launcher tube.) After these parts have been cemented in place, two Chromalox Tubular Heaters wired in series are used to set the cement.



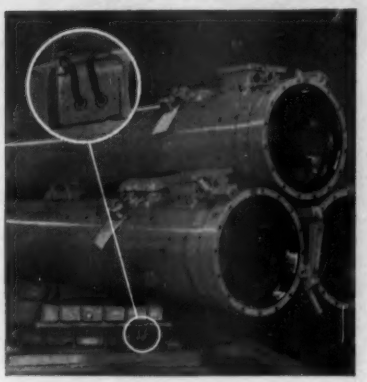
Mounted in a frame which holds them in the center of the tube for its entire length, the 240-volt, 2750-watt heaters are controlled by a Chromalox type AR Thermostat. A small fan attached to the end cap circulates heat within the tube and eliminates condensation during the drying operation.

Next, four plastic quadrants are bolted to the tube interior, forming a liner to accommodate 12¾-inch torpedoes. To each quadrant are affixed two 101-inch Chromalox Flexible Woven Heaters shown below being cemented



in place. After resin has been applied to the two channels in each quadrant, heaters are laid in place. The leads are then connected to a power outlet and the heaters set the cement which bonds them in place. In action, these heaters maintain a protective 50°F. minimum temperature for the torpedo.

The closeup below shows two leads of a circular Chromalox Tubular Heater clamped in a groove around the launcher's swivel base. To prevent formation of ice in the joint between fixed and rotating parts of the base, this heater comes on automatically when the temperature drops below 50°F.



Perhaps one of these heaters, or one of the 15,000 other types, sizes and ratings of Chromalox Heaters can answer your need for heat. For personal assistance and specific recommendations, *call your Chromalox Man for the Answers.* He's listed below.

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Binghamton, N. Y. RA 4-7703
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New York City, N. Y. WOrth 4-2990
Omaha, Nebraska ATlantic 7600
Philadelphia, Pa. GReenwood 3-4477
Pittsburgh, Pa. EMerson 1-2900
Portland, Oregon CApitol 3-4197
Richmond, Va. ATlantic 8-6758
Rochester, N. Y. HAmilton 6-2070
St. Louis, Mo. CHestnut 1-2433
San Francisco, Calif. UNderhill 1-3527
Seattle, Wash. MAin 4-7297
Syracuse, N. Y. HOward 3-2748
Wichita, Kansas AMherst 2-5647

7750

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Electric Heat
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EDWIN L. WIEGAND COMPANY
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For more facts circle 606 on Reply Card

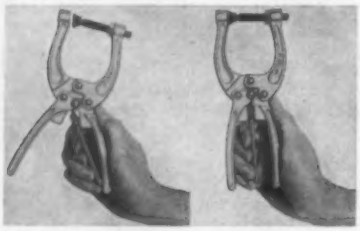
NEW PRODUCTS

(Begins on page 144)

fish oil rendering plant. (In this application the fishy odor was removed from the product by agitating the oil with the deodorant solution and removing the aqueous odor-carrying layer.) In some cases this deodorant can be employed as an additive to product formulations. It can be circulated in the air or mixed with wash water. Manufacturer states that the liquid absorbs nearly all odors when sprayed and also inhibits growth of molds and mildew. It is claimed non-toxic and non-allergenic and not to irritate the skin, corrode metal, stain, burn or explode. It comes in spray containers and in concentrated form. National Cylinder Gas Div., Chemetron Corp.

51—PLIER-TYPE CLAMP works in tight spots

De-Sta-Co Model 462 Clamp, a portable, plier-type tool, has a two-way trigger release for simple, one-hand



operation. It is designed for clamping operations in hard-to-reach positions and provides swift release in operations where space doesn't permit use of both hands. It comes in a variety of sizes with jaw openings to 6 in., holding pressure capacities to 1200 lb. Detroit Stamping Co.

52—NON-SLIP GLOVES are plastic coated

Plastifab 2-15 Gloves feature a non-slip wet and dry grip, says manufacturer, and are suited for handling greasy, oily or other slippery objects. They are coated with a blend of plastic resins and plasticizers to provide abrasion resistance, flexibility and long wear. The gloves are liquid proof and reported to stand up under severe service. Six models include choice of full or partial coatings; all have jersey lining. There are no seams across knuckles. Wing, thumb, fingers and palm are curved. The gloves come in knit-wrist, band top or gauntlet styles and in various lengths. Bulletin S-7924 gives details. Safety Products Div., American Optical Co.

53—PORTABLE SHEDS protect the outdoor workers

Originally designed for use at a shipbuilding company to protect welders on the ground, these portable shelters permit work to continue outdoors when weather would ordinarily halt it. Engineered to withstand winds up to 40 mph without being anchored, the sheds are constructed of a braced steel frame with galvanized steel siding and roofing. To admit daylight, corrugated plastic sheets have been let into the roof, and to permit work after dark, each shed is wired for electric flood lights. Each covers an area of 1600 sq ft, and they can be stacked one on top of another when not in use.

Roughly 40-by-40 ft, the shelters have two sides open to a height of about 7 ft to permit easy access. The

other sides, opposite each other, are covered to within 2 ft of the ground —the 2-ft space left to promote venting of welding fumes. Shelter height is 16 ft, 9¾ in., offering a maximum work height under the peak of about 14 ft. Interior height where sloping sides meet the roof is 7 ft 3 in. Each 25,000-lb shed has three steel lifting lugs welded to the ridge pole and a sling to facilitate moving by crane. Luria Engineering Co.

54—DEGREASING AGENT offers greater safety

No-Tox has degreasing and cleaning characteristics similar to carbon tetrachloride, but is 100 times safer, according to manufacturer. It is also said to be non-flammable and quick drying, and to have the same MAC rating as isopropyl alcohol. It is suggested for use in any type of degreasing operation except vapor phase. Electro-Chemical Products Corp.

55—FIBER GLASS TAPE for high temperature use

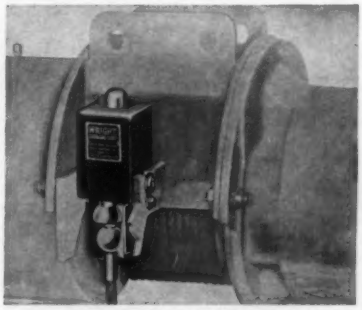
Temp-R-Tape GV is a pressure-sensitive fiber glass tape designed for use in construction and repair of electrical equipment operating at high temperatures. It has a thermal-curing, pressure-sensitive silicone polymer adhesive which, once cured, will withstand operating temperatures to 500 F, according to manufacturer, and short time exposure to 600 F. It is also suggested for use as a high temperature masking tape. While it is unnecessary to cure this tape in place for low-temperature use, the adhesive is said to cure automatically at high temperatures and attain maximum bond strength once cured. In natural color. Temp-R-Tape GV comes in 35-yd rolls in five widths. Connecticut Hard Rubber Co.

56—ELECTRIC COUNTERS adaptable to a-c current

Announced as the first of this type available for use with alternating current for both operating and reset coils, the Model YE Series of electric counters offers speeds to 1500 rpm. They come in four models, panel mounting and base mounting, with instant electric reset or push button instant reset —a time saver in high speed operations. Durant Mfg. Co.

57—CUT-OFF DEVICE protects electric hoists

Built to fit any Wright Speedway Electric Hoist, this overload cutoff is an integral part of the hoist frame and is designed to provide fast-acting mechanical overload protection for the operator, the load and the hoist itself. According to manufacturer, it can take rugged abuse up to the critical point of overload; then it instantaneously "brakes" the raising circuit of the hoist, allowing the load to be safely lowered to the floor and un-



hooked. Once this is performed, the raising circuit is automatically restored. A functional part of the hoist at no sacrifice in headroom, the overload cutoff is available as standard equipment on new Frame 2 and 3 models of the hoist, as optional equipment on Frame 1 and 1½ models. Wright Hoist Div., American Chain & Cable Co., Inc.

58—CLEANING LIQUID for use in steam machines

F.O.-287 does the work of strong alkalis without damage or injury to persons or equipment, according to manufacturer, and no goggles or gloves are required when using it. For use in steam cleaning machines, this viscous

JOHNSON PNEUMATIC CONTROL

For Processing • Heating • Cooling Humidifying • Dehumidifying Ventilating • Air Conditioning

PROCESS CONTROL. Automatic temperature and humidity control for a wide range of manufacturing and industrial process applications. Thermostats, special controllers, valves and dampers applied to tanks, dryers, vats, kettles, curing rooms, coolers, kilns, ovens and other processing equipment.

SPACE CONTROL. Automatic control of room temperature and humidities applied to radiators, radiant heating, unit ventilators, unit heaters and heat delivery ducts. Johnson equipment includes a complete line of thermostats, thermometers, pressure regulators, humidostats, humidifiers, valves, dampers, damper operators, switches, special controllers and related apparatus.

NATIONWIDE SERVICE. Johnson's own full time engineers and installation men are available at branch offices across the nation. Whether your problem involves a complete system or merely a single controller, take advantage of Johnson's over 73 years' experience in solving all types of control problems.

DIAPHRAGM VALVES FOR STEAM AND LIQUIDS

V-153 Sylphon Diaphragm Valve for low pressure steam. Sizes ½" and ¾". *Send for Bulletin V-153.*

V-103 N.O. Globe Valve. ½" to 8" sizes. *Send for Bulletin V-103.*

3-Way Valves for mixing and by-pass applications. 100% tight-closing design. Can be serviced without removal from line. Sizes 2½" to 6". 125 and 250 lb. standard construction. *Send for Bulletins V-211 (By-Pass) and V-214 (Mixing).*

V-111 Sylphon Radiator Valve for low pressure steam. Sizes ½" to 2". *Send for Bulletin V-111.*

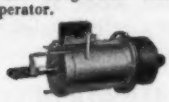
MASTER-SUBMASTER CONTROL FOR STEAM, LIQUIDS OR AIR

T-900 Remote Bulb Master Thermostat. *Send for Bulletin T-900.*

T-901 Remote Bulb Submaster Thermostat. *Send for Bulletin T-901.*

PISTON OPERATORS, PILOT POSITIONERS

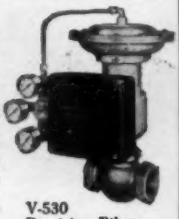
D-251 Long-Stroke Piston Operator.



Pilot Positioner Applied to Piston Damper Operator.

Piston Operators for dampers and similar uses. Compact with fully enclosed spring and rubber diaphragm. Adjustable stops. Available with pilot positioner for applications requiring maximum and precise repositioning power. *Send for Bulletins D-251 and D-265.*

V-530 Precision Pilot Positioner. Powerful, precise! Responds to slightest change in air pressure. Acts 6 times faster than ordinary pilots. Consumes no more air than a room thermostat. *Send for Bulletin V-530.*



V-530 Precision Pilot Positioner applied to valve.

RECORDING AND INDICATING CONTROLLERS FOR TEMPERATURE, PRESSURE, HUMIDITY

T-1000 Record-O-Stat. Records and controls. Built for extreme accuracy under all conditions. Single and two-pen models. Liquid-filled, vapor tension or gas-filled thermal systems. For ranges between minus 125 F and plus 1000 F. Charts for 24 hours or 7 days. *Send for Bulletin T-1000.*

R-1051 Static Pressure Indicator-Controller. Controls at a pressure range as low as 0 to 0.2 in. of water. Extremely accurate for either static or differential pressure control. *Send for Bulletin R-1051.*

THERMOSTATS

T-403 Single Temperature Room Thermostat. *Send for Bulletin T-403.*

T-432 Heating-Cooling Room Thermostat. *Send for Bulletin T-432.*

Series T-800 Thermostats for steam, liquids or air. Proportional or two-position action. Furnished with remote bulb for liquids or air; rigid stem models for insertion or immersion. Separable sockets available. *Send for Bulletin T-800.*

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☐ *New Condensed Catalog of all Johnson Products.*

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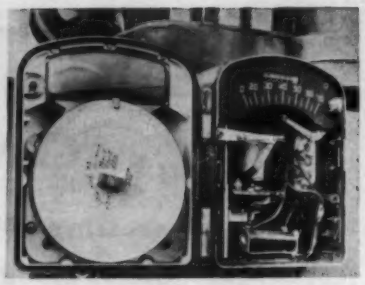
For more facts circle 608 on Reply Card

(Begins on page 144)

liquid does heavy-duty cleaning and degreasing of painted and unpainted ferrous and non-ferrous surfaces. It is suggested for such jobs as removal of heavy deposits from fork truck wheels and lift chains, as well as for removal of lighter soils on painted and unpainted surfaces. It is claimed non-corrosive to aluminum and non-clogging to steam generator lines. It is used in the same dilutions as powdered products. Fine Organics, Inc.

59—INSTRUMENT clocks lift truck performance

Increases of 20 to 50 per cent in utilization efficiency of materials handling equipment is claimed for the Truck-O-Meter (announced jointly by Tube Turns Div., Chemetron Corp., and Institute of Modern Management, Inc). This device, mounted on the panel of lift trucks or similar handling equipment, is designed to measure distances traveled and loads handled, and synchronize these records with time of day on a circular dual-purpose chart. It makes available synchronized figures on distance, time and performance



previously available separately, but not so readily combined for analysis, it is explained, providing a practical method of measuring performance and obtaining records from which rates and output standards can be established.

The Truck-O-Meter is described as a dual-purpose recording instrument combining a time clock, an odometer to measure distance traveled, and a pressure-controlled mechanism meter that records vertical lifts and drops. Both lifts and distance traveled are recorded on a single circular chart and correlated with time element for any given period, showing the work accomplished by any fork-lift truck for any period of time. Tube Turns Div., Chemetron Corp.

60—PUMP-MOTOR UNIT is closed coupled, compact

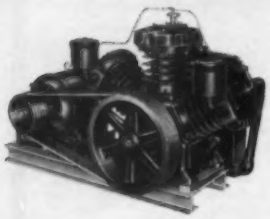
Series 42, a pump and motor combination, is offered for applications where space and weight are at a premium. Measuring only 9⅛ in. by 5 in., the unit incorporates a totally enclosed electric motor, rated for 1/12 to 1/6 hp, and an internal gear pump with a capacity of 1/3 to 3 gpm. There are 24 models in the series, all available with or without a built-in relief valve. The Tuthill Pump Co.

61—PIPE INSULATION for low temp applications

Unarco U-200, an insulation product for use at temperatures from —300 to 220 F, is described as a closed-cell synthetic which will not burn and has excellent heat and chemical resistance. Thermal conductivity tests are reported to show Unarco U-200 to have a K factor of only 0.14 at 70 F mean temperature. It is pointed out that a closed cell content of 85 per cent plus gives this insulation a high degree of resistance to water and vapor. Density is 2.3 lb. per cubic foot. Despite its light weight, it has high compressive and flexural strength, manufacturer states, can be cut and applied with standard tools, and is non-toxic and non-irritating. Unarco U-200 comes in half-round sections of nominal thicknesses in standard pipe sizes. Individual sections are 36 in. long. Union Asbestos and Rubber Co.

Where the going is TOUGHEST the Curtis keeps going!

Sandiest FOUNDRY conditions haven't stopped this CURTIS AIR COMPRESSOR



The CURTIS C-100 two-stage air-cooled air compressor. 25-30-40 H.P.

- CURTIS-SEAL CRANKCASE
- TIMKEN MAIN BEARINGS
- SELF CENTRO-RING OILING
- AIR COOLED: NO COOL WATER REQUIRED
- PRECISION BUILT

For compressed air—industry depends on *Curtis*. Eliminate production line delays. Get more air faster . . . at lower cost. Where the going is toughest (foundry, factory or shipyard) put the CURTIS C-100 to work and forget it!—Full line of industrial compressors for ordinary and special applications.

For complete information write for illustrated folder.

OUR 105th YEAR

Curtis

MANUFACTURING COMPANY · PNEUMATIC DIVISION

Write Dept. 46, St. Louis 20, Missouri C-62

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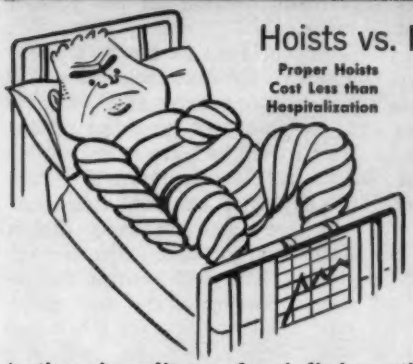
Tuffy Tips —on safe use of Slings and Hoist Lines



Hoists vs. Hernia

Proper Hoists Cost Less than Hospitalization

A manufacturer said recently that 75% of his compensation claims were connected with hernia—a common hazard in heavy lifting. About the same time, we heard from the Ohio Bureau of Workmen's Compensation that the average hernia claim (circa 1957) was $750. No need to stress the need for hoists instead of muscle for lifting tasks. Said "Occupational Hazards" magazine: (Hoists) with proper attention, given slings and periodic inspections, will help substantially in reducing back injuries and hernia claims by reducing the strain on workers."

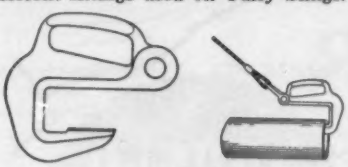
A Few Rules for Safe Use of Hoists and Slings

1. Use a proper size hoist—not human backs and muscles—for every heavy lifting job.
2. Never use load chains as slings. Chain links break easily after distortion.
3. Use the sling that's right for the job. There's a Tuffy Sling for every purpose.
4. When loading slings with more than 2 legs: load a 3-legged sling as though it had 2½ legs; load a 4-legged sling as though it had 3 legs.

Proper Fittings Give Slings Added Safety and Service Life

Union offers a sling fitting for every need. We recommend having them factory-fitted when you order your slings, but they can also be fitted in your own rigging loft. Shown here are two of a score of different fittings used on Tuffy Slings.

NEWCO STANDARD CHOKER HOOK: Standard in design, but extra high in quality and safety. Castings are always smooth and clean. No cutting or chafing slings. This hook can be attached to the end of sling instead of the main body, thus allowing the main part of the sling to be free of fittings.



NEWCO PIPE HOOK: Precisely "tailored" to the job of moving and laying pipe. High strength steel. Capacity of 3500 lbs. Pad at end allows threaded pipe to be handled without damage to threads. Eye opening is large enough to accommodate a shackle or thimble. Hook has a lifting handle for easy moving.

Made for Each Other: Tuffy Slings and Hoist Lines

Tuffy Slings and Hoist Lines make a top-performing team for every kind of hoisting work. Tuffy Slings are made of a patented, 9-part machine-braided wire fabric that's extra flexible, and isn't materially damaged by knotting or kinking. Tuffy Hoist Line is a special rope construction for use on all types of overhead cranes, derricks and clamshells—and wherever else an extra-quality, extra safe hoist line is needed. Reports from the field tell of Tuffy Hoist Lines running two and three times as long as ropes previously used.

Tuffy Kink-Resistance is Unmatched

Kinking is one of the worst hazards of wire rope and sling use. With ordinary wire rope slings, an acute kink results in serious damage and weakening that makes the rope unsafe for further use. With Tuffy, it's a different story. The super-flexible fabric is just about impossible to kink. If it does under exceptional conditions, the kink can be easily straightened out with no harm done.

Safest Ferrule Ever Made

The pressed-on steel ferrule is applied under great pressure. The ferrule metal virtually flows into voids between wires and strands of the fabric. Result: an eye splice with 100% of fabric strength, and a ferrule so smoothly tapered to the sling body that there are no abrupt edges or rough projections to snag or injure hands. And the extra service life, efficiency and safety of Tuffy's pressed-on ferrule are yours at no extra cost.

FREE! New Tuffy Sling Handbook

Revised and enlarged edition. Covers all the bases in selection and use of Tuffy Slings and fittings. Gives types, dimensions and rated loads. Includes safety-approved hand and whistle signals in operation of various equipment. Send for your copy now. **Write Union Wire Rope Corporation, 2272 Manchester Ave., Kansas City 26, Mo.**

Specialists in high-carbon wire, rope, braided wire fabric and stress relieved wire and strand.

Your Tuffy Distributor is Ready to Help You with any Sling or Wire Rope Problem

UNION Wire Rope

S-4

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New steels are born at Armco

For more facts circle 610 on Reply Card

Why Grounding Pays!

(Continued from page 90)

In the preceding test we found that the conduit, installed without a parallel grounding circuit, is an effective equipment ground. Is the present-day bus duct enclosure as effective?

The National Electrical Code's position on the use of the enclosures as low impedance equipment grounds is that any bus duct approved by Underwriters Laboratories has sufficient capacity in the enclosure to safely handle short-circuit fault currents. They assume, much as they assume on conduit installations, that the equipment is installed properly and that no loose joints exist to change the fault current path from low to high impedance.

This position seems to be very practical and appears not to have been questioned since no changes are being considered. However, periodic inspections may reveal that bad enclosure joints have developed due to vibration, corrosion from adjacent processes or lack of expansion joints. In these cases, it may be necessary to bond the joints using a copper or other corrosion resistant material as the bonding jumper.

In conclusion we can say that any approved bus duct enclosure should be adequate to serve as a conductor in an equipment grounding system. Care should be taken to inspect bus duct installations during and periodically after installation to make sure that a low impedance path is maintained throughout the duct enclosure. This will involve the resistance testing of the duct enclosure joints to see that the bolted connections have not developed high resistance due to corrosive vapors in the plant.

If for any reason a separate conductor is used, it should be installed within the bus duct enclosure or, if installed externally, should be bonded securely to each section of the duct. **End**

As easy as plugging in your electric shaver...

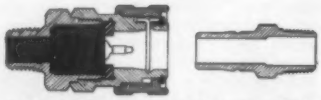
Wherever you use compressed air...

...just

PLUG IN THE POWER

- Tough...compact...smaller...lighter.
- Handles more air—with minimum pressure drop.
- Quick connection and disconnection.
- Instant automatic flow or shut-off.
- Handles any job in your shop using ¼" to ⅛" connections—from the air line to the air tool.
- Locking ring provides positive lock ...tight fit. Equipped with automatic sleeve lock.
- All Series 2-RL Sockets and Plugs are interchangeable—likewise all Series 3-RL Sockets and Plugs. Eliminates all need for various size couplings in hook-up—makes it easy to keep stock of parts in balance—holds inventories to a minimum.

with the HANSEN Series RL QUICK-CONNECTIVE Ring-Lock Coupling



Socket, when disconnected, automatically shuts off air by leak-proof seal of metal valve against rubber valve seat.

Write for the Hansen Catalog... a ready reference when you want information on couplings in a hurry.

Quick-Connective Fluid Line Couplings for AIR • OIL • GREASE • HYDRAULIC FLUIDS WATER • VACUUM • STEAM • OXYGEN • ACETYLENE REFRIGERANTS • GASOLINE • COOLANTS • LP-GAS

SINCE 1915

REPRESENTATIVES IN PRINCIPAL CITIES
QUICK-CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 35, OHIO

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Small Plant Disaster Plan

(Continued from page 101)

salvage crew will repair any damage to the buildings and machinery so that the plant can be put back in operation as soon as possible.

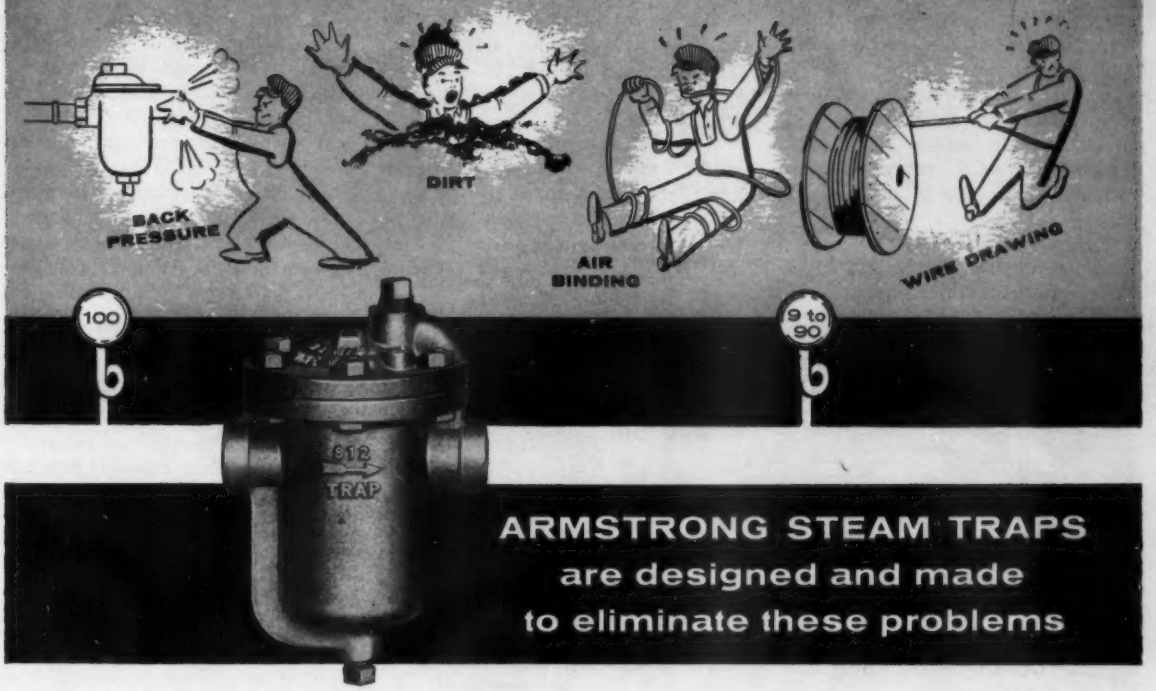
To avoid disruption of production during normal times any phase of this operation can be rehearsed independently, as there is no substitute for periodic drills.

In order to maintain interest during drills and build up enthusiasm in the entire program it is possible to simulate actual damage conditions by issuing written damage summaries from the Control Center to key team members.

A problem might involve the selection of the proper valves to be shut off to avoid the loss of water and the other sources from which hose lines could be laid out to combat the blaze. Consideration must be given to the size of the mains available and distance hoses must be run to avoid excessive friction loss.

The majority of this training is a valuable asset to a plant when an emergency occurs during normal times. So you can visualize the necessity of having a well drilled organization if disaster strikes from the sky. **End**

Have you ever been troubled by any of these steam trap problems?



ARMSTRONG STEAM TRAPS are designed and made to eliminate these problems

BACK PRESSURE . . . Armstrong Traps operate on any back pressure—or vacuum, for that matter. As long as there is a pressure differential across the trap, it will close on steam and open for condensate. Even the high back pressure caused by blow through of one or more traps in the system will not disturb Armstrong Traps. Other than a reduction in capacity, Armstrong Traps are unaffected by back pressure.

DIRT . . . Armstrong Traps are not affected by ordinary dirt. When the trap opens condensate swirls down under the edge of the bucket and up through the discharge orifice. Dirt is kept in suspension and discharged along with the condensate. For very bad dirt conditions, Armstrong offers traps with integral strainers. These cost less than a trap plus a separate strainer.

AIR BINDING . . . Armstrong Traps cannot air bind. Air in the system passes through a vent in the top of the bucket. It collects in the top of the trap and is discharged with the condensate. There is no chance for it to stop the trap. For low pressure on-and-off units where large amounts of air accumulate while the steam is off, Armstrong offers open float and thermostatic air vent traps in a complete range of sizes.

WIRE DRAWING . . . Armstrong Traps are designed and made to resist wire drawing. The valve and seat are tough stainless steel. The valve opens and closes tightly with a fast action and is always water sealed. There is virtually no chance for grit or sediment to lodge in the valve, virtually no chance to create conditions that lead to wire drawing.

There's no need to accept any of these problems as "inevitable." Your local Armstrong Representative can show you how to end them all. Call him today or write direct.

860 Series for low pressure heating service.

800 Series, side inlet, side outlet.

No. 801, side inlet, bottom outlet.

880 Series, integral strainer.

200 Series, bottom inlet, top outlet.

Forged Steel Series for high pressures, high temperatures.

The 48 page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.

ARMSTRONG MACHINE WORKS

9127 Maple Street Three Rivers, Michigan

For more facts circle 612 on Reply Card

New Suspensions for MH Vehicles

(Continued from page 91)

want a super-soft ride under the fragile console, and a weight-hefting suspension beneath the raw stock. With Rubber-Spring Gear you can have both . . . and with the same vehicle.

Using nothing more than a wrench, plant engineers can quickly change the rubber rhombuses: substituting solid rubber blocks (which deflect only an inch or so) for smoother-riding swiss-cheesed rhombuses.

Consoles delivered, blocks can be changed again—and the vehicle tailored for its heavier raw stock cargo.

Almost as radical—and just as novel—is the O-ring suspension, tradenamed Stabilride by its designers, Western Unit Corp., City of Industry, Calif.

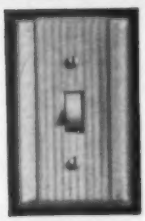
"To visualize how Stabilride works," says a Western Unit engineer, "think of a dozen tire casings stacked one atop another, and supporting a steel beam . . . the vehicle's frame. The more weight you add, the more the casings compress. What you get is a smooth, stabilized ride."

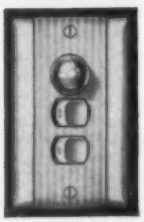
In plant applications, the neoprene columns alone would likely be support enough for a material handler's axles. In heavier highway installations, however, a very light leaf spring bears the truck's empty-weight (4000-6000-lbs per axle). Once an axle is loaded to about 6000-lbs, the leaf springs depress to a point where the frame comes to rest atop the neoprene columns. The "take over" is automatic—via an approximate 1-in. gap between the tops of the neoprene columns and the rig's sub-frame.

Rubber springs? Already bouncing to popularity with the nation's truckers, they promise unique versatility for in-plant material handlers as well. **End**

Built to take it... Indefinitely!

THE NEW P&S ROCKER-GLO SWITCH





Here is a switch that can take it . . . and come back for more. Install Rocker-Glo in the most used and abused stations in institutional, commercial or factory building. Then watch its continuous, perfect, satin-smooth performance.

P&S Rocker-Glo switches are AC switches, designed to be used at full current ratings on tungsten filament and fluorescent loads – one does the work of two AC-DC switches for controlling fluorescent fixtures. Rocker-Glo can be used anywhere old-style toggle switches are used.

Rocker-Glo is sturdily constructed. Its rugged, wall-hugging luminous rocker is not subject to breakage from accidental blows as is the case with ordinary switch handles. It's built to withstand punishment ordinary toggle or specialty switches cannot take – changes no wiring habits. Single Pole and Double Pole switches are indicating – you can tell when they're on or off.

Available in Despard interchangeable type, Despard Type mounted on strap and narrow rocker for tumbler switch plates. A specification grade switch, 15 and 20 amps. 120/277 volts AC.

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Spotless Facilities—Pronto!

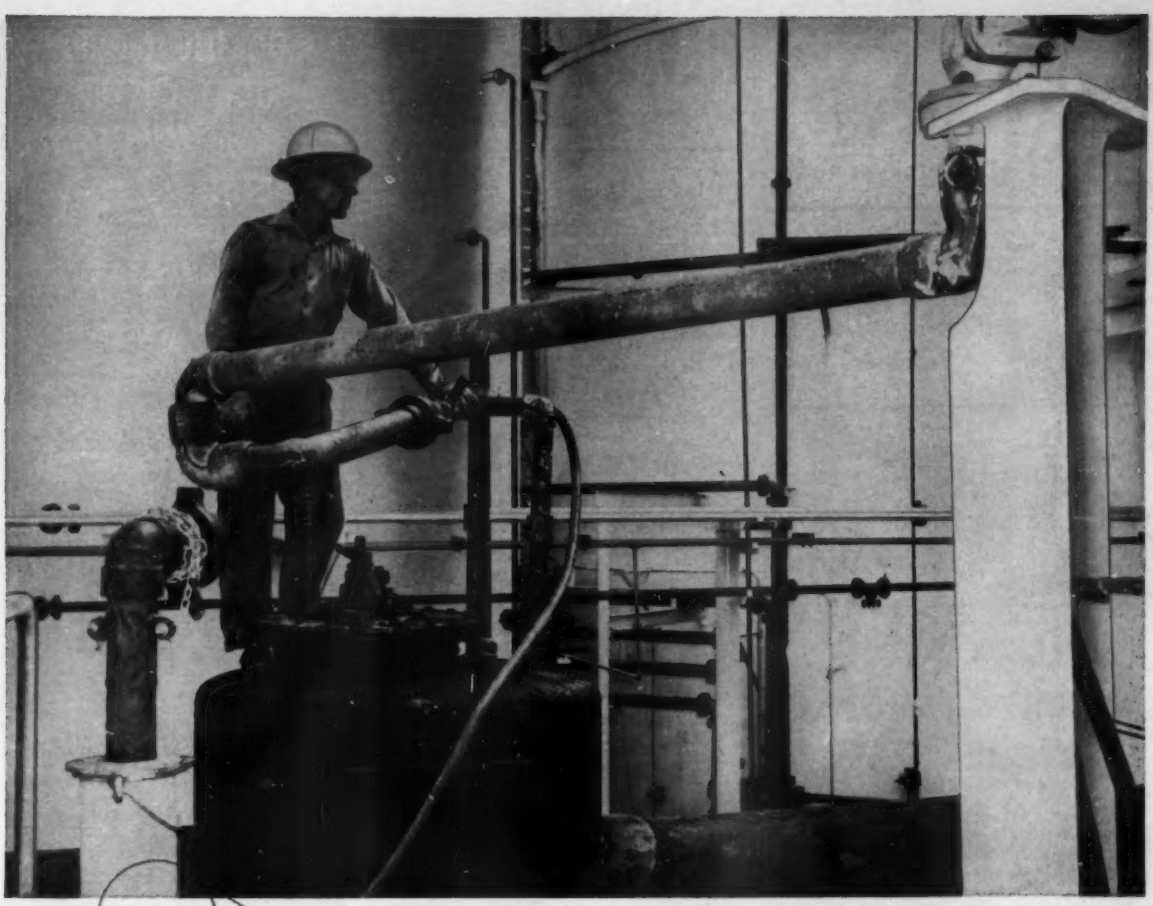
(Continued from page 121)

The cost is 48.5 cents per sq ft per year for 38,181 sq ft of floor area having floor materials consisting of vinyl tile, terrazzo, and carpet. The space consists of laboratories, offices, library, washrooms, stairways, and conference rooms. The three sanitors who work the afternoon shift cover the above 38,181 sq ft or approximately 12,700 sq ft per sanitor.

The day sanitor covers the remaining 36,685 sq ft of floor area. This is chiefly the pilot plant area and includes 2475 sq ft of cafeteria space. Two hours of his daily job time are assigned to cafeteria work. The cafeteria dining room seats one hundred and has furniture that in order to prevent it from becoming marred requires very careful handling. Cost for above 36,685 sq ft is 13 cents per sq ft per year.

The average cost for the total of 74,866 sq ft maintained by the sanitors is 30.7 cents per sq ft per year.

You may wonder how a foreman can be justified for four sanitors. This is accomplished by the foreman doubling as a utility equipment operator on the afternoon shift. Half his salary is charged to utility equipment operations and half to sanitation. **End**



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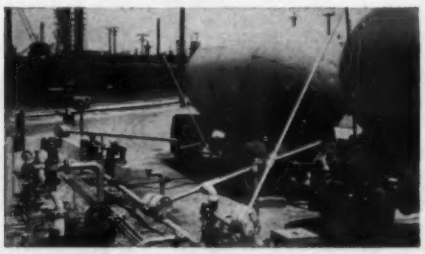

Chiksan Loading Arms deal with hard-to-handle corrosive chemicals, hydrocarbons, and other fluids and gases, speedily and safely, in all kinds of weather.

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Segregation of scrap is simple. Hoppers can be marked for copper, brass, stainless, etc. Brings higher prices.

Roura Hoppers are made in five sizes, ½ to 2 yard capacities. Sturdily built of ⅛" steel plate with continuous arc-welded seams. Also available in stainless steel or galvanized. Mounted on live skids or a choice of wheels. Standard models available for immediate shipment from stock.

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HERE'S HOW to get more details about Roura Self-Dumping Hoppers. Just attach this coupon to your letterhead . . . sign your name . . . and mail to . . .

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1413 Woodland Ave., Detroit 11, Michigan

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NEW BOOKS
for the plant engineer

Design and Analysis

MECHANICAL DESIGN AND ANALYSIS by R. R. Slaymaker, Size 9¼ by 6⅛ in.; over 400 pp; illustrated; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N.Y. Price $9.50.

MACHINE DESIGN students can be given problems that have been tailored to illustrate applications of various theories. In contrast, the approach in this book calls for the use of actual design problems in which students can exercise individuality and realize the need for theory.

The greater portion of this book which has two main parts contains numerous industrial case studies which materialized in the last twenty years. The studies have been used at Case Institute of Technology where the author, who has had industrial experience, teaches.

In the first portion, general topics are discussed such as limit dimensioning; materials and processes; and working stresses.

Some of the projects in the second section deal with the following: redesign of a commutator assembly; drive shaft of an impact extrusion press; metal-clad rubber bushings; needle bearings and planetary gear trains; kinematic design for spur gears; and belt drive for a compressor.

Industrial Organization

DECISION-MAKING AND PRODUCTIVITY by Seymour Melman. Size 8⅝ by 5¾ in.; 260 pp including index; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y. Price $7.00.

THE AUTHOR of this book visited the plants of Standard Motors in England and gathered a great deal of information pertaining to labor management and decision-making. He reports on the use of worker groups which closely follow the delineation of production activities. These entities are called gangs and earn incentive pay.

Some of the topics discussed in this comprehensive book are: workers, management and productivity; the union organization; the process of worker decision-making on production; machines, organization and productivity; comparison of productivity between efforts in the Detroit, Michigan and Coventry, England areas.

The appendices include a memoran-

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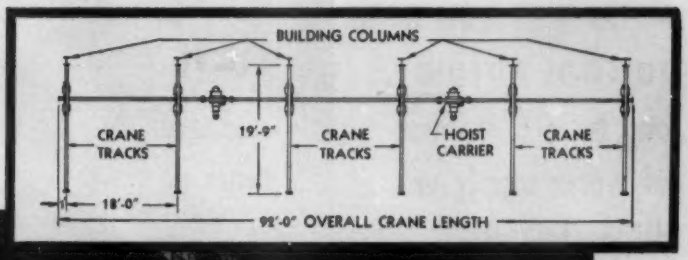

This Cleveland Tramrail installation permits unobstructed operation of other conveyances above and below the Tramrail tracks.

CLEVELAND TRAMRAIL 92'-0" CRANE OPERATES ON **SIX JIB TRACKS**

AN unusual Cleveland Tramrail crane installation serves the punching and spacing table in the structural shop of Omaha Steel Works, Omaha, Nebraska.

A 92-foot long crane extends the length of the table and operates on six jib tracks secured to the building columns. The tracks are supported near the middle and the end by tie rods.

The crane is power-driven and has two hand-propelled carriers with three-ton electric hoists. Conductors are SAFPOWRBAR® which assure maximum safety and reliability.

The Tramrail installation permits a heavy overhead crane to travel above and is devoid of special track support columns which would restrict movement of materials. The hoist carriers can be traveled quickly to any point on the crane and handle beams on the floor or machine. Beams of any length are easily maneuvered with the two hoists.

Thousands of plants are using Cleveland Tramrail in a multitude of ways to effect important savings. For any overhead materials handling problem, you will find it to your advantage to consult with Cleveland Tramrail sales engineers.

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NEW BOOKS

dum of a Standard Motor's shop steward to management and an actual summary of agreements of a union contract involving the Standard Motor Company Ltd, dated January 1951.

Filler Metals

FILLER METALS FOR JOINING by O. T. Barnett. Size 9¼ by 6-3/16 in.; 244 pp including index; illustrated; cloth bound. Published by Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. Price $7.00.

PROPER JOINING of metals requires in addition to good technique the right type of filler metals. Information on the latter is found in this reference manual which covers ferrous and nonferrous metals. Applicability of materials are topics that are treated.

The book deals with automatic welding of mild and low alloy steels, stainless steel, copper and copper alloys, surfacing and tungsten electrodes, and other electrode types. It contains ten chapters on arc welding electrodes. Discussions on soldering and brazing are also included.

How To Put Thinking to Work

PROFESSIONAL CREATIVITY by Eugene Von Fange. Size 5¾ by 8¾ in.; 256 pp; cloth bound. Published by Prentice-Hall, Inc., 70 Fifth Aveune, New York 11, N. Y. Price $4.95.

CREATIVE THINKING is in all of us. All we have to do is apply ourselves. You will find many helpful suggestions in this book aimed at bringing out all the latent creativity which is stored up in you.

The author has conducted creative engineering classes at General Electric Company's Engineering Program since 1937 and has incorporated a lot of his experiences in this book. Since 1954, he has conducted Creative Seminars for widely varied professional personnel in industry.

A basic study of understanding creation is your introduction to the material ahead. From this beginning, he covers such facets to guide your thinking from the raw material—knowledge—to judgement and reflection, and emotions and environment. He continues by setting up a basic plan, investigating direction, establishing measures, developing methods and, finally, the completion of the problem.

Any person from an engineer to the man on the street will find this book interesting and, very possibly, find the basics of help to him in approaching difficult plant problems in a different light.

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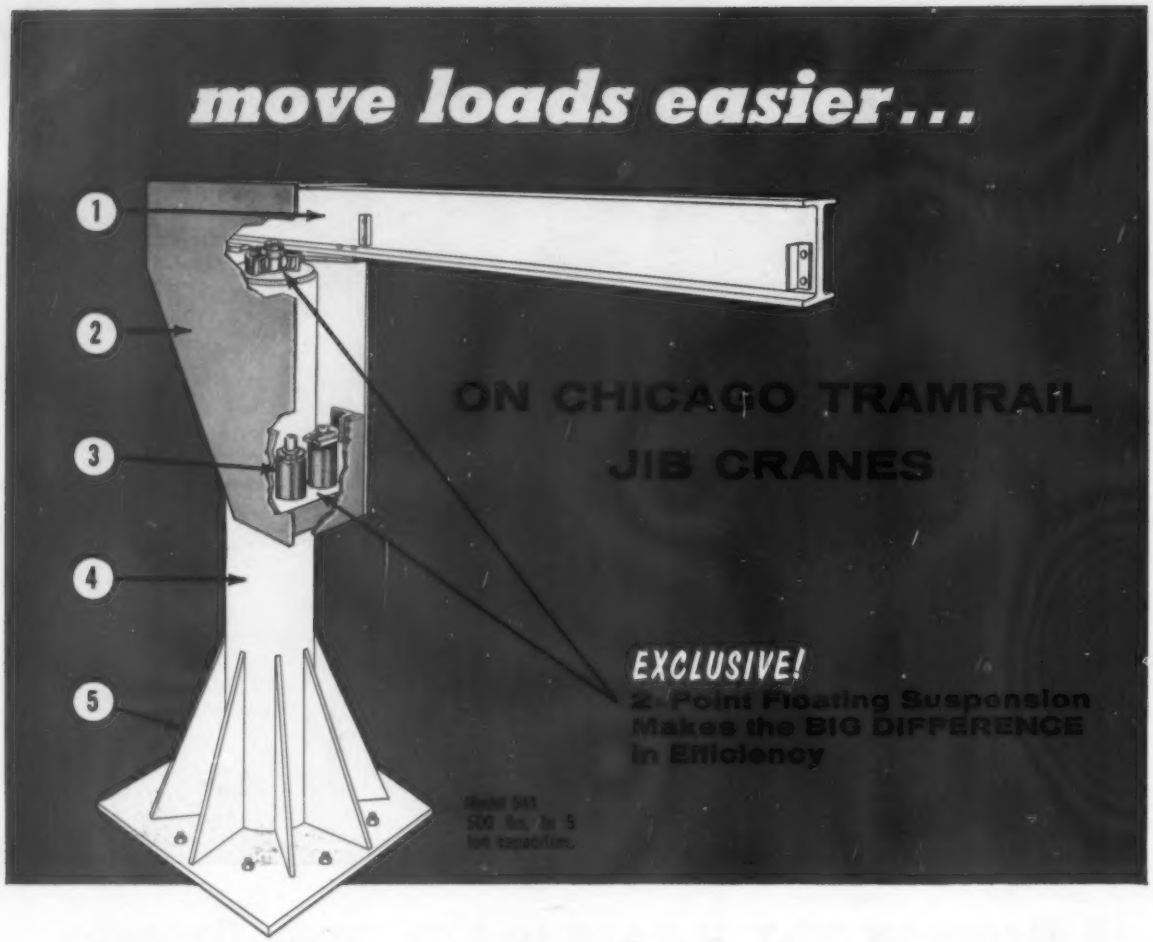


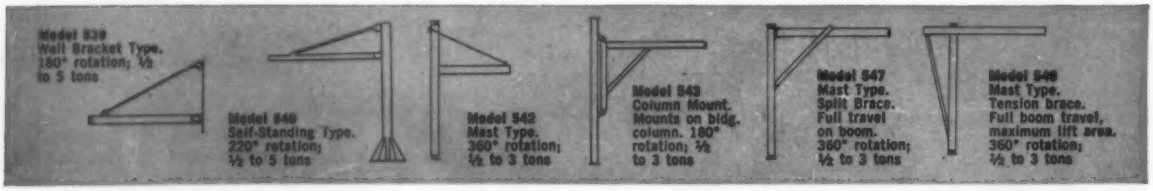
1. **High carbon, hydraulically straightened Beam designed to accommodate heavy duty electric hoists.**
2. **Rigid box construction to insure minimum deflection.**
3. **Bottom roller assembly adjustable for leveling boom.**
4. **Heavy seamless steel column.**
5. **Numerous heavy steel gusset plates welded to column and base provide accurate alignment between column and base.**

Free and easy boom swing is a designed-in characteristic of every Chicago Tramrail Jib Crane. For example, the 2-point suspension used in the Model 541 Jib Crane literally floats the boom through its 360° swing — makes heavy load handling a fast, easy job.

Two bottom load carrying rollers, equipped with heavy duty precision ball bearings, engage and bear on the surface of the vertical column; the top bearing is a precision radial and thrust bearing. This combination assures minimum drag and free boom rotation.

All structural and mechanical parts of Chicago Tramrail Jib Cranes are designed to withstand loads which include heavy duty electric hoists and 25% impact. Every detail of these cranes is designed and built to insure fast, efficient, and safe load handling. That's why you see more Chicago Tramrail Jib Cranes at work . . . and more being installed every day.

Chicago Tramrail Jib Cranes are made in more than 12 types; capacities to 7½ tons, spans to 22 ft., with heights and mounting details to suit your application. Write for complete Jib Crane Catalog.



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BULLETINS

(Begins on page 23)

144 Portable Switches—Bulletin F49 describes a weathertight, corrosion-proof portable switch design completely insulated with a synthetic rubber compound. A fold-out illustration shows both front and back sections as weel as interior view of push-button station. Joy Mfg. Co.

145 Metal-Clad Switchgear—Bulletin 2804-1A contains 22-pp of detailed information on company's line of metal-clad switchgear. Features and advantages are fully detailed and technical descriptions, dimensional drawings, panel layouts included, and various types of indoor, outdoor and walk-in enclosures are pictured. I-T-E Circuit Breaker Co.

146 Precision Switches—Catalog 359, 28-pp, contains information on Unimax-snap-acting precision switches, including new sealed switches for severe environments. General purposes, low-force, high-sensitivity, open-blade, metal-cased, AN and JAN, d-c and reset switches are covered, as well as integral and auxiliary actuator styles. A pictorial index shows where to find dimension drawings, specification tables and electrical ratings for each switch listed. Data on bases, terminals, circuit arrangements etc. are also provided. Unimax Switch Div., The W. L. Maxson Corp.

147 Pressure Switches—Catalog PS-59-60 is a 36-pp design handbook featuring Meletron pressure switches. Each page describes a specific type (diaphragm, bourdon tube, or piston) and contains information on electrical and operating characteristics, ordering chart, adjustment instructions, spare parts table, dimension diagram. Catalog also serves as a manual of technical data and includes a glossary of terms, pressure switch selection chart, electrical rating tables, functional schematic symbols, trouble-shooting and maintenance checklist. Barksdale Valves.

148 Dielectric Test Set—Bulletin 22-5 describes an instrument available in bench and portable models for making step-voltage-current (or resistance) tests, voltage withstand and breakdown tests on the insulation of electrical equipment with ratings of 300, 600, 2500 v and higher. Specifications and prices are included, also outline of design and operating features of the instrument. James G. Biddle Co.

149 Electrical Insulation—Booklet E-PCLC, on electrical insulation tapes, is a 32-pp guide and catalog with application information and specifications for electrical insulations. Product information, data for choosing electrical tapes, temperature limitation chart, guide for thermosetting tapes, test methods and outline of research and quality control are provided. Tapes with acetate, cotton, glass cloth, paper and plastic backings, resin tapes, resins covered. Minnesota Mining and Mfg. Co.

150 Polyethylene as Insulation—Bulletin RCT 710 is a 10-pp technical paper on flame retardant polyethylene as insulation for wire and cable. Generously illustrated with tables and charts, this paper includes a bibliography and an appendix giving specifications for black flame-retardant polyethylene jacket insulation. Rome Cable Corp.

METALS

152 Wrought Iron—Mn wrought iron, a specialty alloy wrought iron containing approximately 1 per cent manganese, is described in this 8-pp booklet. Charts showing metal's impact resistance at sub-zero temperatures are included, as well as data on corrosion and other properties. A. M. Byers Co.

153 Galvanized Steel Sheet—This 36-pp buyer's manual on galvanized steel sheet describes the significant factors governing properties, applications, specifications, purchase and maintenance of galvanized steel sheet for industrial uses. Illustrated with photos, drawings and charts, manual discusses methods for computing required quantities of galvanized sheet, and charts simplify such considerations as allowance for laps, number of formed sheets required to cover area. American Zinc Institute, Inc.

TOOLS, WELDING AND MACHINE SHOP

154 Industrial Hand Tools—Precision hand tools for industry are featured in this 12-pp bulletin. Among items described and illustrated are replaceable-blade knives, a locking plier, and a variety of hand drill-pin vises, pliers, tweezers, chuck adapters, saws, and scraping and probing tools. Handicraft Tools, Inc.

155 Machinists' Tools—Catalog 37M, 48-pp, lists manufacturer's line of tools generally used by machinists and toolmakers. Photos of products and applications accompany descriptive text covering features and functions. Booklet presents a wide range of micrometers, squares, protractors, gages, V blocks and clamps, calipers and dividers, tool sets, dial test indicators, scribers, vernier tools others. Ordering and price information included. Brown & Sharpe Mfg. Co.

156 Metal Lathes—Featured in this 20-pp bulletin is a line of metal lathes for a variety of industrial applications. Bulletin includes catalog listings, complete specifications, description of accessories for all models, and a full page on motors and controls. Delta Power Tool Div., Rockwell Mfg. Co.

157 Band Saws—Included in this cover folder are eight separate insert sheets describing features and applications of company's horizontal metal cutting band saws. Dimensions, specifications and accessories are covered. W. F. Wells & Sons.

158 Drill Buyers' Guide—Catalog 359 devotes 44 of its 68-pp to engineering data, providing latest information on drills and drilling procedure. Covers such subjects as drill reconditioning, drilling speeds and feeds, jig drilling and handling of difficult-to-machine materials. Also provides complete specifications and descriptive information on center drills, combined drills and countersinks, counterbores, drill sets, screw extractors and sets, spotting and centering drills, twist drills. The Cogsdill Twist Drill Co., Inc.

159 Pipe Welding—Two technical articles on small pipe welding—"Fabrication of Small Piping by Welding and Brazing," and "Designing for Welded Systems of Small Size Pipe," —are featured in 10-pp Bulletin Form ADR 118. Air Reduction Sales Co., Div. Air Reduction Co., Inc.

Postage-free Reader Service Cards make it easy to order bulletins. Cards are provided on the facing page.

160 Tape Control Positioning—This 10-pp brochure, Form LO-5902, describes advantages of company's method of tape control positioning and illustrates applications. Tells how different aspects of the system work and how these relate to fast and accurate positioning. Jones & Lamson Machine Co.

161 Tube Cleaners, Expanders—Eight-pp Catalog R53C describes tube cleaners, tube expanders and portable pneumatic tools. Features and advantages are fully illustrated and described, and specification data is included. Thomas C. Wilson, Inc.

162 Tape in Metalworking—Described in this 52-pp catalog are pressure-sensitive tape applications for metalworking industry. Among those illustrated are machining and finishing, electroplating, stamping and fabricating, welding, product assembly, painting, product promotion, packaging and shipping, plant maintenance and others. Minnesota Mining and Manufacturing Co.

VIBRATION CONTROL

163 Vibration, Noise Control—Eight-pp Booklet K4E gives engineering specifications and performance data for 27 types of products for control and measurement of machinery vibration, shock and noise. Installation photos show solutions to typical problems. Discusses relative merits of steel springs and organic materials as isolation media. A selector chart covers a wide range of equipment, showing recommended and suitable alternate methods of isolation. The Korfund Co., Inc.

BULLETINS

(Begins on page 23)

164 Vibration Recorder—Bulletin K12A describes a small, non-electric, hand-held instrument which makes a tape recording of machine vibration amplitude. Applications are detailed and specifications included. The Korfund Co., Inc.

COOLING AND AIR CONDITIONING

165 Central Air Conditioners—Featured in 76-pp Bulletin 9227 are low and high pressure central station air conditioners. Discusses and illustrates design features, construction details, cooling and heating coils and accessories. Tables are included to indicate fan capacities, coil air friction, selection factors, water coil data, coil capacities and physical data. American-Standard.

166 Liquid Cooler—Bulletin 104R features a liquid cooler for accurate control of chilled water or solutions. Advantages are fully detailed and diagrams showing design and construction features are included. Niagara Blower Co.

167 Steel Cooling Towers—Bulletin 53-902 describes horizontal induced draft steel cooling towers. Included are dimensional data and diagrams, as well as capacity table and specifications. J. F. Pritchard & Co.

168 Liquid Absorbent—Bulletin 140 describes a hygroscopic liquid designed for removing moisture from air. Operation of company's air conditioner using the liquid absorbent is illustrated and a chart showing water vapor equilibrium is included. Niagara Blower Co.

INSTRUMENTS, CONTROLS

169 Recorders, Controllers—Bulletin GEA-6887, 12-pp, describes continuous self-standardizing strip-chart recorders and recording controllers for measurement of electrical and process variables. Includes product photos, application data, typical control system schematics, specifications, dimensions. Employing electronic servo-operated measuring systems, the instruments are designed to record with accuracy while providing sufficient torque to operate control devices. General Electric Co.

170 Turbine-Type Flowmeter—Described in this 8-pp bulletin is a turbine-type flowmeter for bulk plants, pipelines, refineries, chemical, food processing and other industrial services. The Potter-Bowser Meter Div., Bowser, Inc.

171 Instrument, Control Panels—Details of construction, dimensions, weights, instrument mounting and accessories for a standard line of instrument and control panels are presented in 16-pp Product Specification G71-7. Standard procedures for tubing and wiring are given along with convenient check list for ordering. Bailey Meter Co.

172 Packaged Control Panels—Illustrated 10-pp Bulletin 170 presents a line of packaged automatic control panels for gas-engine-driven compressors. Component features are fully described and typical installations are pictured. Clark Bros. Co.

173 For Steam Service—This catalog sheet covers a differential pressure regulator for steam service, for controlling atomizing steam pressure at an adjusted value higher than fuel oil pressure, and one for controlling it at value lower than oil pressure. Contains photos, lists of materials, and information on installation and operation of valves. Atlas Valve Co.

174 Gas Flow Control—Twelve-pp Form ADC 888 presents gas flow control equipment for argon, helium and carbon dioxide. Operation and applications for this equipment are described and photos of each type provided. Catalog covers manufacturer's newest additions to the line—a series of fixed-pressure regulators with flow adapters. Details on demand type proportioner for users of special gas mixtures for pipeline distribution systems. Air Reduction Sales Co.

176 Lifting Magnets—Twelve-pp Bulletin 1300 covers both all-welded and bolted magnets. Provides operating data and lifting capacities for magnets ranging up to 80-in. diam, and includes details on magnet controllers. The Electric Controller & Mfg. Co., Div. Square D Co.

177 Plate Magnet—Eight-pp Bulletin 1074 gives detailed selection data for existing chutes, ducts, conveyors or other material handling equipment. Tables show recommended magnet size according to conveyor size, speed of material flow, size or mesh of material. Stearns Magnetic Products.

OTHER EQUIPMENT

178 Duct Fans—Bulletin A114A, 12-pp, presents belt-drive fans, from 12 to 60 in., with adjustable driver sheaves which permit quick adjustment of fan speed. Also gives dimensions, performance data and construction details on direct-drive duct fans in the same size range, the Bi-Pass duct fan with the motor mounted in a tunnel out of the air stream, and a reversible duct fan which moves air in either direction. Hartzell Propeller Fan Co.

180 For Blast Cleaning—Heavy-duty Rotoblast barrels are described in 16-pp Bulletin 705. Cutaway drawings and sketches show wheel construction, along with features of heavy-duty cleaning barrels. Capacities for each size of the five heavy-duty models are included. Also treated is the T-section extra-heavy work conveyor and the push button door. Case histories are presented to show how the units are saving money in installations. Pangborn Corp.

182 Electric Process Heaters—Catalog 60, 64-pp, illustrates complete line of Chromalox electric process heaters and discusses their many uses. Presents some 15,000 types of heaters to fit most applications. Includes a comprehensive application section and a technical section to aid in accurate calculation of heating requirements. Each product is illustrated and described with lists of types, sizes and ratings. Edwin L. Wiegand Co.

Among New Catalogs Of Special Interest

183 Guide to Chain Usage—Chain Data Bulletin 59, 28-pp, is a chain sample book illustrating most sizes of 17 types of welded and weldless chain. It is intended to aid in selection of correct type and size for the application. Actual size illustrations, recommended uses and working load limits are given. Also, trade sizes and numbers, material size, weight per 100 ft, number of links per foot, finish and packing information given. S. G. Taylor Chain Co., Inc.

184 On Refractory Cements—How to select the right refractory cement for the job is stressed in this 20-pp booklet on cements, mortars and coatings. Product descriptions cover metallurgical refractories, general purpose and special purpose types and coatings. Features, performance data and application suggestions are provided. Firebrick and special shapes are also covered. Mexico Refractories Co., Div., Kaiser Aluminum & Chemical Corp.

185 For Drafting Rooms—New products and improvements in established lines are presented in this 1959 general catalog, 24-pp, on drafting equipment. Introduced is the Staktube roll file, a "file and find" storage system for large rolled blueprints and drawings. Also shown are Inter-Master and Panmaster flat drawer files, Draftmaster, StacorMatic, Thriftmaster and Woodmaster drawing and drafting tables and equipment. Catalog is fully illustrated, and provides dimensional and ordering information. Stacor Equipment Co.

186 For Water Treating—Bulletin 615, 24-pp, describes recent developments in manual and automatic zeolite water softeners, demineralizers and deionizers, dealkalizers, ion exchangers, filters, purifers, aerators and degasitors. Also covers spray and tray type deaerating heaters and water treating chemicals. Generously illustrated, explains basic operating principles of each type of equipment. Elgin Softener Corp.

187 Floor Maintenance—Many types of industrial floors are studied and their soil removal problem analyzed in this 8-pp booklet, complete with charts, list of cleaning compounds, and descriptions of cleaning

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BULLETINS

(Begins on page 23)

methods. Methods of sanitizing, stripping wax and paint, and of absorbing liquids are also discussed. Oakite Products, Inc.

188 Tubing and Facilities—Form CF-3 is a 14-pp revision of company's tubing and facilities catalog. Describes carbon and alloy seamless steel tubing in mechanical, pressure and other grades. A foldout flow chart shows major steps in seamless steel tube production. Contents also cover electric welded carbon steel tubing in mechanical and pressure grades, forging and fabricating operations, special tubular shapes. Ohio Seamless Tube Div., Copperweld Steel Co.

189 Corrosion Resistant Equipment—Characteristics and advantages of Corite—a structural material for corrosion resistant plant equipment—are detailed in this 8-pp bulletin. Physical properties, manufacturing and design data, and chemical resistance are covered. Corite Products Inc.

190 Clamps and Brackets—Engineering Design Manual TA210G contains 88-pp of data on standard clamps, line supports, brackets, and shims in a wide variety of shapes and sizes. Included in the manual are labor and cost saving installation techniques for all types of electronic, hydraulic and mechanical harnessing problems, information on standard extreme high and low temperature insulating materials plus data on chemical resistance. TA Mfg. Corp.

191 Aluminum Coated Wires—Described in 6-pp Folder DH-537B are aluminized steel wire and wire products, including steel core wires, steel strand guy wire, overhead ground wire, toe wire, messenger wire, telephone wire, chain link fabric and barbed wire. Properties and applications listed. Page Steel & Wire Div., American Chain & Cable Co., Inc.

192 Hydraulic Packings—Sixteen-pp of engineering data are contained in Bulletin P-333, which describes homogeneous and fabric reinforced hydraulic packings. Information includes design, construction, sizes, applications, installation, as well as illustrations, engineering drawings and tables. Crane Packing Co.

193 Projector, Reflector Lamps—Twelve-pp Bulletin LS-152 contains information on design and application of projector and reflector lamps. Simplified design procedures and light distribution data is furnished. General Electric Co.

194 To Kill Hot Fires—Brochure P-48, on dry chemical fire extinguishers, outlines "how to use" and "recharge techniques" for 2½- to 30-lb models. Accessory equipment, is also covered. Includes chart explaining classes of fires and approved portable extinguishers to be used on each. Walter Kidde & Co., Inc.

195 Coating Systems Compared—Chart No. 5 compares 17 standard maintenance coating systems showing strong and weak points of each. Accurate resistance ratings are listed for acid, alkali, solvent, water, weathering, flexibility, impact and abrasion, and temperature conditions. Compatibility over old paint, surface preparation included. Carboline Co.

196 Lubricant Selection—Bulletin 121 is a lubricant selector chart for extreme pressure lubrication applications. Evaluate various types of lubricants as to temperature, environment, method of application, incorporation into common materials, and recommendations for various parts, operations and conditions. The Alpha-Molykote Corp.

197 Electronic Counters—Featured in this product bulletin is a line of high speed electronic counters. Various types of counters are illustrated and described and engineering details furnished. Veeder-Root Inc.

198 Air Starting Motor—Case histories on air starting motor installations are presented in 24-pp Form 5094-E. Includes selection data, detailed specifications and mounting-dimensions diagrams, piping arrangements and suggested hook-up for vehicles. Ingersoll-Rand Co.

199 Industrial Furnaces—Featured in this product bulletin are batch, automatic, continuous, gas, electric and oil industrial furnaces. Typical applications are illustrated and a table of heat treating processes and applicable furnace and protective atmosphere types included. Sunbeam Equipment Corp.

200 Dryer, Blender, Sterilizer—Bulletin IN-200 describes a method of programming, drying, blending and sterilizing operations individually or in combination from a single unitized console. Advantages and applications in processing bulk materials are covered, and operation details are illustrated. Wilmot Castle Co.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided on pages 185 and 186.

LUBRICANTS, LUBRICATION

301 Lithium Greases—This product information bulletin presents manufacturer's six Litholine industrial greases, stressing industry advantages offered by these multi-purpose greases. Gives properties of greases, application and performance characteristics. Sinclair Refining Co.

302 Plug Valve Lubricants—Reference Book 39—Section 5A, 16 pp, describes company's plug valve lubricants and lubrication accessories. Standard lubricant table gives detailed description and extreme temperature range of each lubricant. Homestead Valve Mfg. Co.

303 Lubrication Systems—Bulletin 1450 illustrates and describes a line of lubrication and coolant systems engineered to provide maximum protection to bearing surfaces. A typical mill lubrication system is shown. Dravo Corp.

304 Organized Lubrication—Benefits of organized lubrication are extolled in this 24-pp bulletin. Cost control opportunities are detailed and the task of assigning responsibilities and delegating authority in an organized lubrication system discussed. Method of determining savings and setting up records to measure results covered. The Texas Co.

305 Product Guide—This handy little booklet gives information on manufacturer's line of industrial products—general lubricants, greases, diesel lubricating oils, metalworking oils, hydraulic oils, heat-transfer oils, waxes, petro-chemicals, spray oils, solvents, others. Sun Oil Co.

306 Lubricant Data—Characteristics, advantages of company's line of specialized fluid and grease type lubricants are described in 32-pp Data Book 59-1. Includes sections on control of friction, use of grease type lubricants, proper applications, and recommendations for various operating conditions. Lubriplate Div., Fiske Brothers Refining Co.

CONSTRUCTION

307 Pole-Type Buildings—Easy steps in building pole-type industrial and other buildings are presented in this 8-pp pocket-sized booklet. Deals with uses of pressure-treated, rot and termite resistant poles and lumber. Contains practical step-by-step guide, with diagrams, covering site location, pole setting, roof construction, splash boards, application of siding. Wood Preserving Div., Koppers Co., Inc.

308 Tubular Building Frames—Described in 6-pp Bulletin 5M are advantages of company's line of tubular building frames which require no welding, cutting, riveting or bolting at building site. Design and construction details are illustrated. Swiss Fabricating, Inc.

309 Foundation Pipe Piles—Comprehensive information on Taylor

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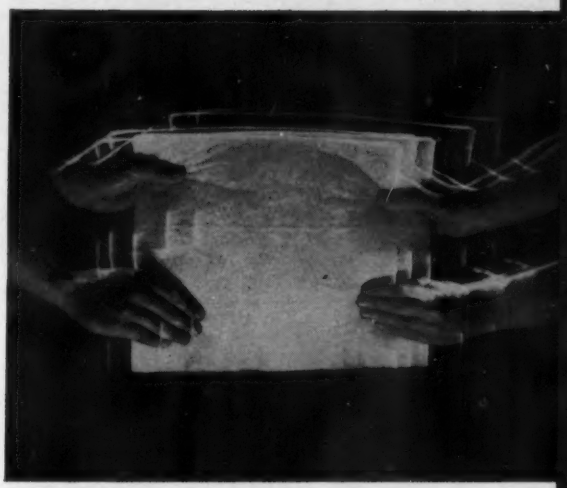

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DATA FILE

(Begins on page 190)

Forge spiral-weld foundation pipe piles is presented in 24-pp Form F-5677. In addition to detailed specifications, the illustrated booklet describes a number of pipe-pile installations and includes driving logs. L. B. Foster Co.

310 Open Web Joists—Standard and long span open web steel joists are illustrated and described in this 38-pp catalog. Advantages of the steel joist construction are detailed, and sections are included on design calculation, properties and dimensions. United States Steel Corp.

311 Structural Glass—Catalog 59-1 contains essential data on company's line of rolled, figured and wired glass for a variety of industrial applications. Advantages and important functions are described, and light distribution tables and specifications are included. Mississippi Glass Co.

312 Replacement Glazing—Twelve-pp Booklet PL-251 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic, Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems, this practical booklet gives properties of this sheet. Plastic Dept., Rohm & Haas Co.

313 Data on Panel Material—How to improve factory methods with Masonite Presdwood is discussed in this 12-pp illustrated bulletin. Advantages are listed and types of presdwood used in maintenance and materials handling are indexed. Which type to use and where is covered. Masonite Corp.

314 Rugged Concrete Floors—How Masterplate concrete floors last six times longer than many concrete floors is explained in 24-pp Bulletin MP-4d. Discussed are major features sought in design of industrial floors subject to heavy use. Photos and diagrams illustrate explanations on method of installation and plants in which these floors are now in service. The Master Builders Co.

315 Flooring Products — Bulletin 659 describes emery-based paving, patching, and grouting materials and brick, and bonding and curing agents, as well as a special formulation with emery aggregate designed for heat resistance. Includes estimating data. Walter Maguire Co., Inc.

316 Steel Floor Plate — Skid resistance and other advantages of USS multigrip rolled steel floor plate are stressed in this illustrated bulletin. Also gives dimensions, data on loads. United States Steel Corp.

317 Non-Slip Flooring—Algrip, an abrasive rolled steel floor plate described as non-slip even on steel inlines, is the subject of Booklet AL-29, 8 pp. Discusses safety features, fabricating. Alan Wood Steel Co.

318 Safety Grating—Steel, aluminum and stainless steel safety grating for a variety of industrial applications is featured in illustrated 24-pp Catalog 5911. Shows typical installations, and includes complete engineering data for erection, as well as detailed load charts. The Globe Co.

319 Grating and Treads — Bulletin 2566 is a revised illustrated bulletin on grating and treads for a variety of applications. Presents descriptions of electro-forged, riveted, rectangular, diagonal, U-type, and T interlocked grating and treads. Tables of safe loads and information on specifying are also included, as well as photos of applications. Blaw-Knox Co.

PUMPS, COMPRESSORS

320 Rotary Blowers, Pumps—Full details on continuous-service rotary positive pressure blowers, gas and vacuum pumps are included in 20-pp Bulletin S65C. Contains photos and cut-away drawings, showing construction features, as well as explanation of operating principles and a list of applications. Sutorbilt Corp.

321 Single Suction Pumps — Ball bearing single suction pumps are illustrated and described in 24-pp Bulletin 976-G. General data and specifications are included, as well as rating tables, outline dimensions, sectional reference drawings. Buffalo Pumps, Div. Buffalo Forge Co.

322 Pump-Motor Units — Features and advantages of company's line of Motorpumps designed to operate equally well in any position are detailed in 24-pp Bulletin 7093-F. Cross-sectional diagrams illustrate component features, and tables list approximate dimensions and weights, performance data. Ingersoll-Rand.

Reader Service Cards for ordering bulletins are on pages 185-186. Be sure to include your name, job title, and company, even if you want bulletins mailed to your home address.

323 Stationary Compressors — Sixteen-pp Catalog 5910 describes features and advantages of a line of stationary air compressors designed for a variety of industrial needs. Tables of weights, code words, and dimensions are included, as well as schematic diagrams, cutaway views showing design details, and other data. Schramm, Inc.

324 Oil-Free Compressors—Heavy-duty industrial oil-free compressors are featured in 12-pp Bulletin A-44. Component parts are illustrated and described, and internal construction is shown on cutaway. Joy Mfg. Co.

325 Air Compressors — Bulletin CAS-17A describes a line of two-stage-air cooled, industrial air compressors. Features and advantages are listed, typical applications pictured, and specifications and other data included. Curtis Mfg. Co.

326 Angle Air Compressors—Bulletin 625 contains 8 pp of information on features and operation of company's angle air compressors designed to provide efficient air service in small space. Cutaway views showing component features are included, as well as table of ratings and dimensions. Pennsylvania Pump & Compressor Co.

SEALS, PACKINGS

327 Too Hot to Handle? — Described in illustrated Catalog 480 is a circulating seal designed to reduce temperature of liquid in stuffing box. Cutaway view and diagram illustrate design and construction features of the circulating ring which provides circulation of liquids to maintain temperatures. Durametallic Corp.

328 External Mechanical Seal — Bulletin CP-551 features a mechanical seal designed for complete interchangeability with packing in stuffing boxes of pumps and other rotating processing equipment. Cutaway drawings and an installation diagram are provided. Chemical and Power Products, Inc.

329 Self-Lubricating Packings — Featured in this 30-pp bulletin is detailed information on company's line of packings with internal lubrication. Application chart, table of physical properties, and ordering instructions are included. Greene, Tweed & Co.

MAINTENANCE

330 Basic-Roofing Information — "What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioriation, what to do to keep a roof in good condition. Discusses roofing practices. Johns-Manville.

331 Aluminum Roof Coatings — Advantages of aluminum asphalt roof coatings are detailed in 12-pp Form AD 454. Full application information includes recommendation for use, how much is required, and surface preparation. Aluminum Co. of America.

332 Handbook on Coatings — This 1958 Coating Manual is a 32-pp treatise highlighting the stopping and preventing of rust on nearly all types of rustable metal. Book contains information and recommendations to enable determination of specific coatings needed. Basic principle of Rust-Oleum's fish oil penetration into metal is shown. Rust Oleum Corp.

333 Zinc Coating — This bulletin describes a special zinc coating applied as a paint to provide galvanic protection to metals. A variety of applications are detailed. Subox, Inc.

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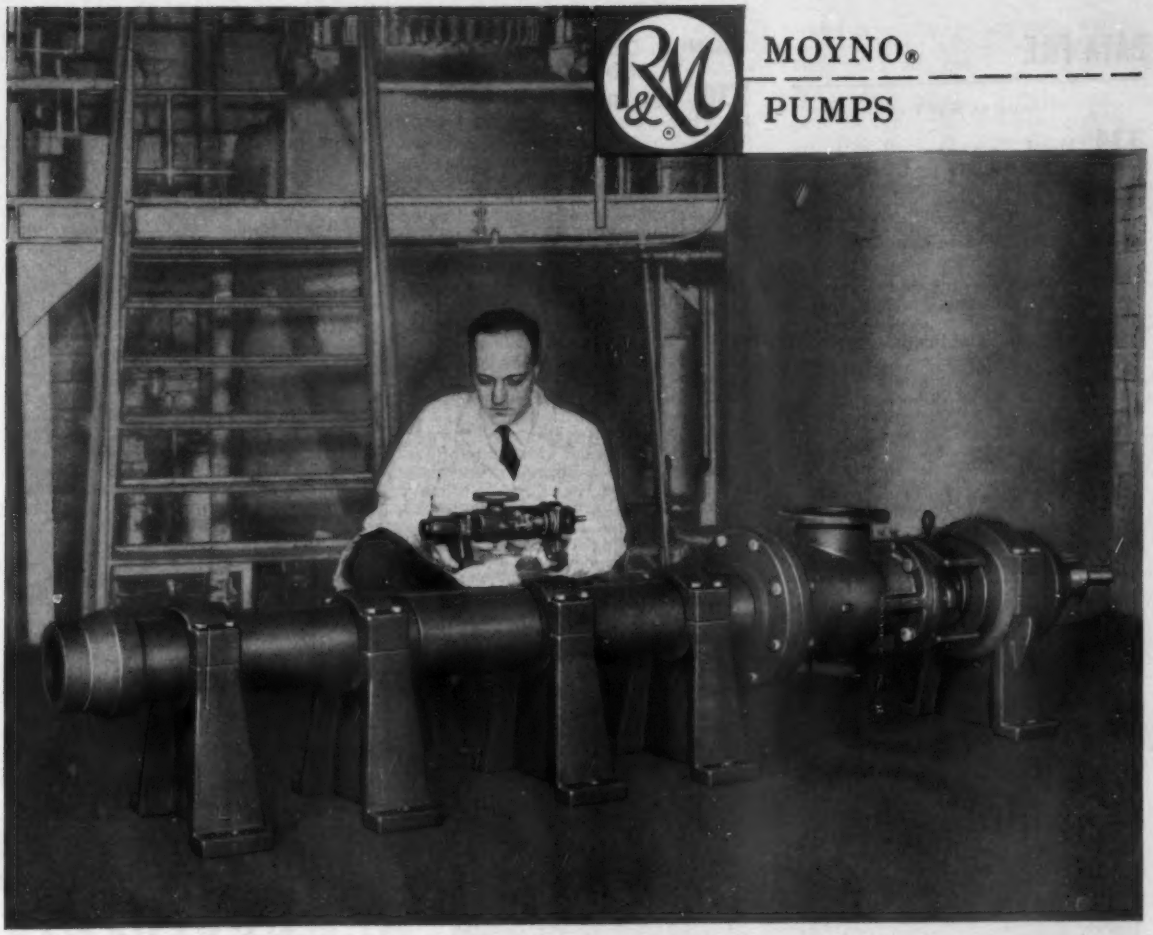

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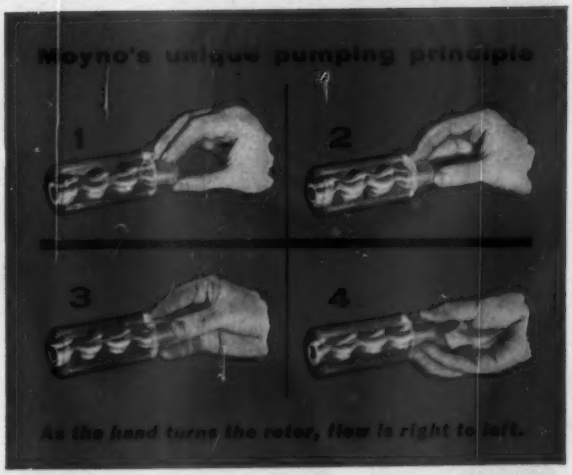

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DATA FILE

(Begins on page 190)

334 **Metal Treatment**—Booklet 15 describes a metal treatment that stops rust action and prepares rusted metal for paint. Advantages are detailed and application method illustrated. Rusticide Products Co.

335 **Color Conditioning**—How to put the power of color to work profitably is explained in this 28-pp color conditioning booklet. Tells how color conditioning boosts production, improves morale and promotes safety, and includes some full-color photos to illustrate "before-and-after" situations in typical plants. E. I. du Pont de Nemours & Co., Inc.

336 **Industrial Steam Cleaners**—Advantages of cleaning with steam are illustrated and described in this 6-pp bulletin. Applications for heavy-duty production cleaning, paint-stripping, phosphatizing are detailed and complete specifications on the portable units given. Turbo Machine Co.

337 **Vacuum Units**—This bulletin describes heavy-duty, portable vacuum units designed for a variety of plant housekeeping jobs. Application in removing litter, conveying or recleaming materials, and collecting hazardous matter is covered. Invincible Vacuum Cleaner Mfg. Co.

SLINGS, CHAINS, WIRE ROPE AND FITTINGS

338 **Sling Handbook**—Form SL-3 is an illustrated 40-pp reference book covering more than 80 subjects on slings and fittings. Included in this revised edition is reference information condensed into handy chart form on sling types, dimensions and rated loads. Union Wire Rope Corp.

339 **Drop Forged Fittings**—Comprehensive data on company's line of drop forged fittings for wire rope and chain are presented in 40-pp Catalog 950-2. Includes specifications, dimensions, rated capacities and weights. Crosby - Laughlin Div., American Hoist and Derrick Co.

340 **Wire Rope Manual**—"Inspection of Wire Rope," "Methods of Lubricating Wire Rope," "Use and Abuse of Wire Rope," and "Sheave Maintenance" are among subjects covered in this 188-pp Wire Rope Manual, Catalog G-16. In addition, there are sections devoted to strengths and weights of wire rope, cable assemblies, and rated capacity of slings. Manual is available to qualified plant engineers. Macwhyte Co.

341 **Wire Rope Selection Tips**—This 16-pp illustrated booklet, "How To Be A Wire Rope Expert," describes basic principles governing selection of proper rope construction. Describes five factors to be considered and shows how these can be balanced for best possible efficiency regardless of application. Also illustrated is a device called the D/d ratio for determining best relationship of rope size to sheave or drum size. Rope constructions shown. Leschen Wire Rope Div., H. K. Porter Co., Inc.

MATERIALS HANDLING

343 **Electric Hoists**—Six-pp illustrated Bulletin 905 describes R&M Type J electric wire rope hoists in capacities of ¼, ½, 1 and 2 tons. Shows complete specifications including mounting options and sectional drawing. Hoist & Crane Div., Robbins & Myers, Inc.

344 **Electric Hoists** — Twelve - pp Bulletin DH 133D describes Speedway electric hoists of 500- to 4000-lb capacities. Fully illustrates and explains design features and gives details on suspensions and conducting systems. Clearance data included. Wright Hoist Div., American Chain & Cable Co., Inc.

345 **For Overhead Handling**—Booklet 2008-N 12 pp, is replete with illustrative material on principal components of overhead handling systems. Track design and advantages of supporting it flexibly are described, and formulas and figures for comparing various track systems given. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

346 **Vibrating Conveyors**—Advantages and features of vibrating con-

veyors are detailed in 16-pp Catalog 66. Layouts and flow charts showing how conveyors can be designed to perform a wide variety of processing operations at the same time the material is being conveyed are included. Ajax Flexible Coupling Co., Inc.

347 Overhead Conveyors—Essential information and profit-making ideas are contained in this one-volume library on overhead conveyors. Collected in a single folder are engineering data, field reports on use of overhead conveyor systems, product bulletins, material on features, tips on maintenance. Pictures, charts, drawings and diagrams are also included. Available to qualified plant engineers. Rapistan-Keystone, Inc.

348 Materials Handling Hose—Presented in Bulletin S-5121 is a line of materials handling hose for industrial applications. These include use in sand blasting, for steel shot blasting, for industrial vacuum cleaners, and for blowing insulation into walls. The Goodyear Tire & Rubber Co.

349 Self-Dumping Hopper — Described in Bulletin 260 is a self-dumping hopper for low-cost handling of wet or dry, hot or cold, bulk materials. A variety of standard models are pictured and described in detail. Roura Iron Inc.

350 Caster, Wheel Manual—Featured in 192-pp Manual 65 is comprehensive information on company's complete line of casters, wheels, glides, desk shoes and accessories. Profusely illustrated with photos and dimensional drawings and diagrams of the various types of casters and wheels for a variety of applications, the manual contains tabulated engineering and price data. Darnell Corp.

HEATERS, HEATING

352 Industrial Heaters — Advantages and features of a line of industrial heaters for space heating, drying, make-up air and oven applications are detailed in this illustrated bulletin. A cutaway view points out features. Lennox Industries, Inc.

353 Electric Heating Units—Catalog 50, 50 pp, contains complete engineering data on electrical heating units and equipment, including strip elements, finstrip elements, tabular elements, cartridge elements, ring elements, immersion heaters, circulation heaters, radiant heaters, forced air duct heaters, unit heaters, hot plates and others. Includes photos, dimensional drawings, prices, standard rating tables, and specifications. Edwin L. Wiegand Co.

354 For Heating Systems—A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695, 28 pp. Detailed illustrated information pertaining to heating problems is given Besides covering heating terminology there are sections on steam data, water properties piping data, weights and measures and pipe dimensions. Dunham-Bush, Inc.

355 Unit Heaters—Catalog 158, 28 pp, contains performance and application data on company's line of unit heaters, including design and construction details, dimension diagrams, and tabulated information on steam capacities, conversion factors, performance factors. Modine Mfg. Co.

356 Panel Coils—This condensed index lists applications of panel coils in industrial heating and cooling processes. A variety of applications are illustrated. Dean Thermo-Panel Coil Div., Dean Products, Inc.

INSULATION

357 For Insulation Protection—Provided in this comprehensive loose-leaf manual is technical information covering practically every requirement for insulation protection. An aid to proper adaptation and application of mastics, flashing compounds, adhesivies and surface coatings ,this book presents information classified as to industry usage, as power, process, cold storage. Book is available to qualified plant engineers. Benjamin Foster Co.

358 Insulation Specifications—This set of six specifications covers applications of Foamglas insulation for industrial equipment and piping. Each booklet contains tables of suggested

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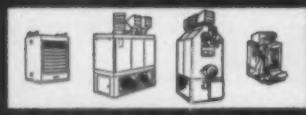

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DATA FILE

(Begins on page 190)

thicknesses of insulation to be applied, drawings of installation procedure, supports, and recommended finishes. Booklets are devoted to low-medium-, high-, and dual-temperature equipment and piping, to underground piping, and spheres. Pittsburgh Corning Corp.

359 Insulation Coating—This 32-pp illustrated handbook, Form L-17, presents the advantages of company's No-Drip insulation coating for preventing condensation drip from metal, concrete, brick, wood, plaster, or composition surfaces. Lists applications. J. W. Mortell Co.

360 Pipe Insulation—Properties and advantages of fiber glass pipe insulation are detailed in this product bulletin. Tables list dimensional and packaging data, and specifications given. Pittsburgh Plate Glass Co.

ELECTRICAL

362 Drip-Proof Motors — Bulletin 857 contains 12 pp of detailed information on company's line of open drip proof and totally enclosed fan cooled motors. Construction features are described and tables of engineering data and specifications included. Brook Motor Corp.

363 High Voltage Control—This 16-pp booklet discusses general features of company's high voltage control equipment. Details individual characteristics of both full and reduced voltage types of high voltage control for squirrel cage, synchronous and wound rotor motors. Ratings, dimensions, optional features listed. Cutler-Hammer Inc.

364 Control Switchboards—Relay and control switchboards are the subject of this illustrated 22-pp bulletin. Various components of the equipment are described, and typical specifications, line diagrams, and other engineering details included. Northeastern Engineering, Inc.

Postage-free cards for ordering catalogs are on page 186. You may also use the cards to order literature mentioned in the ads.

365 Protective Equipment Guide—Form SPD is a 24-pp handbook on selection of protective devices for electric circuits, motors, appliances and apparatus, and is besed on 1956 National Electrical Code. Besides providing suggestions on how to select right kind of protection, booklet provides wiring diagrams, motor tables. Bussmann Mfg. Co.

366 Protective Relays—Featured in 16-pp Catalog 5-020 are time delay overcurrent relays, directional inverse time overcurrent relays, differential relays, instantaneous overcurrent relays (adjustable setting), inverse time voltage relays, auxiliary relays, ac-dc definite time relays, and reclosing relays. For each model, tabular data and photos cover its applications. Federal Pacific Electric Co.

367 Portable Distribution System—Described in this 30-pp catalog is a portable distribution system for electric lighting and power, including such applications as portable lighting, heating and ventilation equipment, welding machines, power tools, and lighting transformers. System diagrams showing how each unit fits are included. Whitney Blake Co.

368 Electrical Equipment — Condensed Catalog No. 5 contains 48 pp of descriptive data on company's line of electrical products, including conduit bodies, conduit fittings, connectors, ground fittings and EMT fittings. Dimensional data and features are shown. Gedney Electric Co.

369 Distribution Equipment — Detailed information on company's line of electrical distribution equipment is presented in 82-pp '59 Marketeer, Catalog M-159. Among equipment described are Electrostrip multi-outlet assemblies, switches, lighting panelboards, power panelboards, switchgear assemblies, and various types of electrical duct. Tables of essential data. BullDog Electric Products Co., Div. I-T-E Circuit Breaker Co.

370 Electrical Equipment Digest—Electrical equipment illustrated and described in 160-pp Catalog Digest 142, includes load centers, circuit breakers, low voltage control, fusible service equipment and accessories, meter sockets and troughs, safety switches, panelboards, duct and fittings, starters. Square D Co.

371 Commutator Maintenance—This commutator and slip ring maintenance data file contains information on methods and procedures for more efficient commutation. Individual bulletins cover brushes, sparking, picking, dragging and other troubles, maintenance tools and how to use them. Ideal Industries, Inc.

372 Electrical Wires, Cable—Bulletin 1105, 16 pp, features a cable selection chart and complete engineering information on company's line of electrical wire and cable. Advantages are detailed. The Okonite Co.

373 Flexible Electric Conduit—Performance and application data on company's line of flexible plastic covered electrical conduit, liquatite, are featured in this illustrated brochure. Specifications and ordering data. Electri-Flex Co.

374 High-Voltage Cables—Bulletin RCD-700 describes features and advantages of company's shielded high-voltage power cables sheathed with a flame-retardant polyethylene material. Details on ozone-resisting insulations are given, as well as tables of insulation and sheath thicknesses. Rome Cable Corp.

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DATA FILE

(Begins on page 190)

375 For High Voltage Cable—Test results and service records on an improved butyl rubber compound for high-voltage cables are announced in 12-pp Bulletin EB-27. Covers resistance to ozone, operating temperature, high-voltage, dielectric strength, aging, insulating resistance, absorption. Anaconda Wire & Cable Co.

376 Wiring Devices — Catalog 60, about 80 pp, presents ordering data on wiring devices including a wide range of switches, convenience outlets, lampholders, fluorescent devices, cord connectors, adapters, wall plates, accessories etc. Fully illustrated with photos, catalog provides condensed information on features, dimensions, applications. Pass & Seymour, Inc.

377 Fuses for All Uses—This revised edition of manufacturer's complete line, Folder 3, includes illustrations and descriptions of fuses for every purpose. Features dual-element cartridge fuses for time-lag in protection against overloads, and delay renewable fuses and renewal links. Economy Fuse & Mfg. Co.

378 Electrical Equipment—Twelve-pp pictorial Bulletin 2706 describes fabrication and applications of company's electrical equipment, including conduit fittings, electrical equipment enclosures and devices, floodlights and traffic control. Photos show installations. Crouse-Hinds Co.

379 Improved Battery Plate—Bulletin GB-1876 features information on silconic battery plate available on company's motive power batteries. Describes a process for introducing arsenic and silver cobalt sulphates into the active materials of positive plates which produces storage batteries having longer life, improved electrical characteristics. Gould-National Batteries, Inc.

380 Control Batteries—Bulletin CP-540 describes features and advantages of a line of batteries for control, switchgear and auxiliary power. Engineering details and specifications are tabulated. C & D Batteries, Inc.

381 Cable Reels—Bulletin RL 258 describes construction, uses and features of constant duty Type RL cable reels for lifting or supporting extra-flexible type rubber jacketed cords for an uninterrupted power supply. Gives technical data with specification drawings and dimensional tables. Appleton Electric Co.

LIGHTING, COMMUNICATION

383 Architectural Floodlighting — Eight-pp Bulletin GEA-6437 illustrates various methods of floodlighting industrial plants, public and commercial buildings and others. Provides information on general purpose models. General Electric Co.

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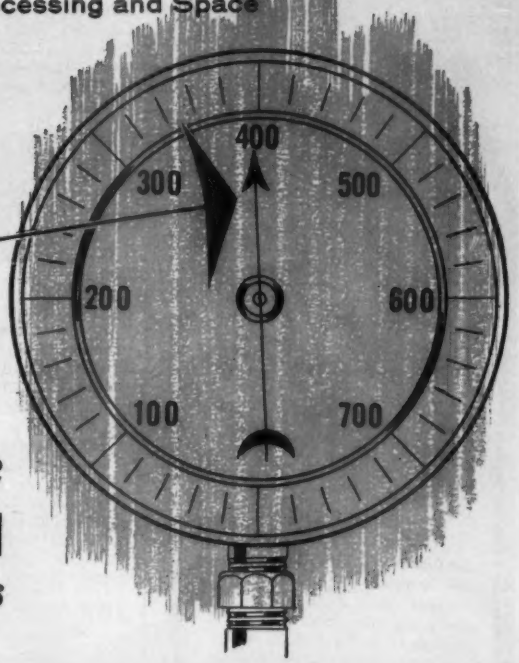

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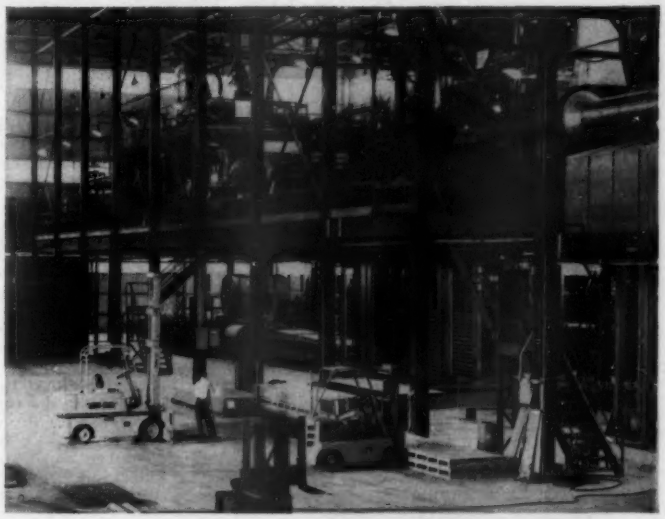

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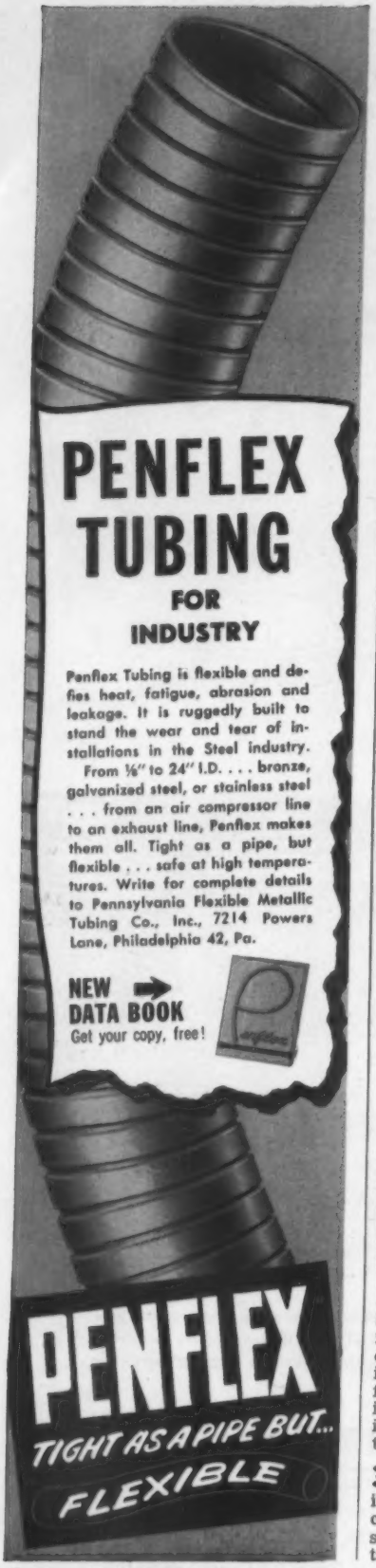
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DATA FILE

(Begins on page 190)

384 Lighting Standards—The 1959 Edition of the RLM Standard Specifications Book, a reference guide for industrial lighting units, has been strengthened in the areas of efficiency, design and construction quality. New specifications are also included covering two- and three-lamp special service fluorescent units, three types of units utilizing 800 ma fluorescent lamps, new incandescent reflector sizes, and mounting specifications. RLM Standards Institute.

385 Illumination Design Data—Basic reference data on interior lighting installations is contained in 48-pp Manual A-4854, which features a section describing footcandle levels required for each group of seeing tasks. These footcandle levels are then related to many kinds of rooms and areas. Westinghouse Electric Corp.

386 Lighting Fixtures—This 12-pp condensed catalog gives a compact presentation of company's fluorescent and Brascolite incandescent luminaries. Data on surface and pendant mounted units, recessed luminaries, and Gratelite electric ceilings provided. Edwin F. Guth Co.

387 Incandescent Lighting—The 24-pp "Incandescent Lighting Guide Book" features sections on the general advantages of incandescent lighting, the history of incandescent lamp developments, and includes chapter on basic types, bulb shapes, sizes, glass types and finishes, and bases. Sylvania Electric Products Inc.

388 Signal Equipment—Tips on how to select suitable signals for any specific operations are offered in Bulletin 100. Describes horns, bells, warning lights, other signal equipment. Specifications, photos, wiring diagrams, dimensions, audibility rating charts, electrical characteristics. Federal Sign & Signal Corp.

DUST, FUME CONTROL

390 Dust, Fume Control—A wide range of industrial dust and fume producing processes that can be successfully controlled with the properly designed cloth or glass bag-type dust collectors is covered in 24-pp Bulletin 562-D. Operating principles are illustrated. Wheelbrator Corp.

391 Power Exhausters—Bulletin 58-B contains 12 pp of detailed information on company's line of power exhausters. Construction features are illustrated and described, and performance and dimensional tables are included. Cutaway views and drawings show internal construction features. Jenn-Air Products Co., Inc.

392 Dust Free Handling—Featured in Bulletin V-100 is the Verticone, a conditioner unit for dust control, designed to apply on-the-spot conditioning to dusty materials in all types

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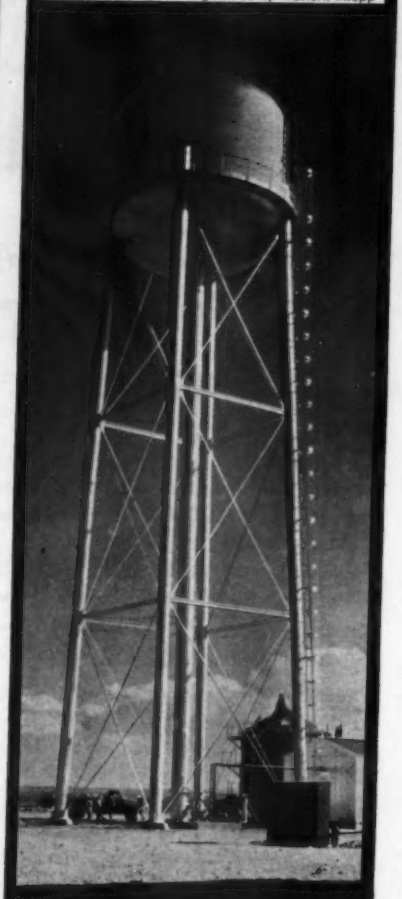

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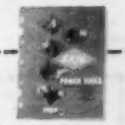

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DATA FILE

(Begins on page 190)

of handling. Explains how the Verticone works, and illustrates construction features. Johnson-March Corp.

393 **Industrial Dust Control**—A wide variety of collection methods for industrial dust control is described in 16-pp Bulletin 922. A typical case history is included as well as photos, cutaway views, drawings and capacity data. Pangborn Corp.

394 **Dust Control Systems**—Bulletin 104, 36 pp, on company's dust filters, gives detailed information about dust control systems and how to engineer them. Includes description of the Roll-Clean Dynaclone dust filter, as well as information, capacities and dimensions for other dust fiters. The W. W. Sly Mfg. Co.

VALVES, TRAPS, PIPING

395 **Control Valves** — Illustrated Bulletin 581 describes Slim Line control valves, only 1-in. thick by 3 in. wide, which mount on any machine and can be manifolded into compact control centers. Presents solenoid, hand lever and ball actuated types. Hunt Valve Co.

396 **Industrial Valves** — Bulletin 507V illustrates and describes company's line of industrial valves for control of air, gas, liquids and solids. Features photos and descriptive detail on a variety of valves, including butterfly valves, water valves, slide valves. W. S. Rockwell Co.

397 **Steel Check Valves**—Bulletin 110 describes features and advantages of steel check valves for vertical or horizontal installation. Specifications and dimensional tables are included. Combination Pump Valve Co.

398 **Stainless Steel Valves**—Corrosion resistant stainless steel valves are featured in 32-pp Catalog 59SS. Features of design and construction are shown through cutaway views, and advantages of stainless steel in withstanding corrosive attack of chemicals and atmospheres are detailed. Jenkins Bros.

399 **On Steam Traps**—Catalog K is an enlarged 48-pp manual and steam trap catalog. New material provided includes open float and thermostatic traps, pipe strainer to 6 in. in steel and semi-steel, and helpful steam pipe sizing tables. Discusses fundamentals of good trapping, trap selection, installation, testing, repairs. Armstrong Machine Works.

400 **Manual on Traps**—This 40-pp engineering manual is designed to assist in the sizing, specifying and selection of steam traps and other fluid specialties. Includes steam trap selection guide, explanation of four basic types of traps and how they perform their function, four steps to follow in sizing a steam trap, table of factors and detailed instructions

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DATA FILE

(Begins on page 190)

on how to select steam traps for over 45 major classes of equipment. The V. D. Anderson Co.

401 **Impulse Steam Traps**—Bulletin T1744 describes a line of impulse steam traps designed for light condensate load requirements. Operation is detailed, and capacities, dimensions tabulated. Yarnall-Waring Co.

402 **PVC Pipe, Fittings**—This 12-pp bulletin contains latest technical information on polyvinyl chloride pipe and fittings, including advantages and properties, general characteristics and applications, physical properties, installation instructions, flow rate charts and complete specifications. Also included is a chemical resistance chart of various reagents and their effect. Mueller Brass Co.

403 **Glass Pipe and Fittings**—Corrosion-resistant qualities of this Pyrex brand glass pipe and fittings which make it suitable for use under corrosive conditions are described in 44-pp Bulletin PE-3. Operating temperatures, physical characteristics, installation procedures are covered and specifications and dimensional drawings given. Corning Glass Works.

404 **Swivel Joint** — Features and advantages of company's swivel joint which permits fast, easy packing interchangeability are illustrated and described in Bulletin 1258. Table of specifications and properties are included, as well as dimensional data and diagrams. Chiksan Co.

405 **Expansion Joints** — Features and advantages of company's line of expansion joints and flexible couplings are illustrated and described in 12-pp Form AD-137. Standard dimensions and other engineering data are included. The Garlock Packing Co.

On pages 185-186 are two postage-free Reader Service Cards provided for your convenience in ordering these catalogs. You may also use the cards to order any literature mentioned in the ads.

406 **Guide to Couplings**—This 26-pp general catalog desecribes company's quick-connect, quick-disconnect couplings, including a coupling for high pressure applications, for impact in air lines, for low pressure applications, for vacuum and very low pressures, etc. Snap-Tite, Inc.

407 **Fluid Line Coupling**—Catalog 100 contains data sheets describing company's line of quick-connective fluid-line couplings for pneumatic, hydraulic, oxygen, acetylene, steam, various gases and liquids service. Photos and dimensional diagrams are included. The Hansen Mfg. Co.

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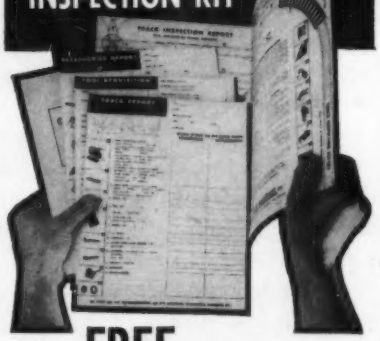

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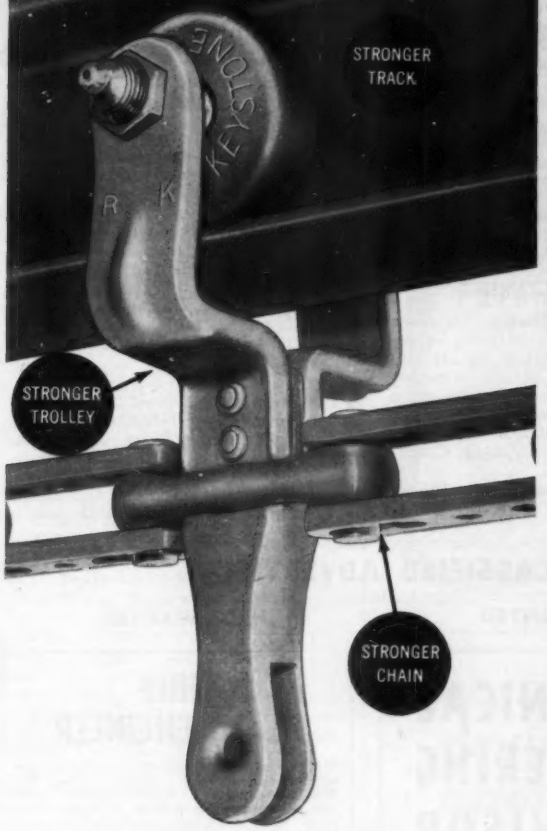

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ADAMS FACT FILE #2

PLANT AIR

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Every company today is looking for ways to offset the increased costs of labor, material, equipment and services. At a gasoline station you expect "Free Air", but in industry it is a major expense. Perhaps in your own plant, for an investment in a few minor compressed air system alterations, significant savings are possible.

Water, sludge, rust, oil and dirt in compressed air systems are prime causes of maintenance and production down-time. Water vapor condensing in air lines tends to corrode the piping. Also, water present in the piping may freeze during winter, causing serious reduction of compressed air supply. Such restrictions are often difficult to locate and thaw. This same line moisture may emulsify lube oil destroying its lubricating value and the resultant mixture has high fouling characteristics. Frequently, ice will form within the tool itself since expanding air cools the moisture . . . tool efficiency will be seriously affected.

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Wet compressed air is not only a construction and production tool problem. Faulty paint jobs, contaminated chemical and food products can often be traced to moisture laden compressed air. Waterhammer, unequal pipeline thermal expansion and line leaks also result from collected moisture. In addition, air lost through traps, and in blow-down of compressed air lines provide no useful work . . . represent a sizeable power loss.

You Can Lick Compressed Air Moisture Problem . . .

All of these hidden costs can be virtually eliminated by the installation of an Adams Aftercooler and Cyclone Separator between the compressor and receiver tank. By cooling discharge air to within 10° F. of cooling water temperature — guaranteed with Adams standard Aftercoolers — the moisture can be removed at the separator. Pressure loss is less than one-half pound on these units including the separator. In severe cases, moisture removal of over 90 per cent can be obtained by cooling the air with Adams 2° Aftercooler to within 2° F. of water temperature.

Air Filter for Final Protection at Point of Use . . .

As an added safeguard for expensive tools and equipment, an Adams Poro-Stone Air Filter should be installed just before the air is used. These filters remove all solid material picked up by the air stream. With an Adams Aftercooler, Cyclone Separator and Air Filters clean, dry, trouble-free air is supplied to your production tools. You get continuous service with minimum maintenance.

For further information on how the complete line of Adams air equipment can solve your compressed air problems, write today for your free copy of Bulletin No. 712 on Aftercoolers and Bulletin No. 117 on Poro-Stone Air Filters from the R. P. Adams Company, Inc., 254 East Park Drive, Buffalo 17, New York.

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DATA FILE

(Begins on page 190)

408 Bellows Design Guide—Twenty-pp Catalog 15 contains helpful information on applications, design considerations, and standards for metallic bellows. Details on using bellows manufactured from various metals are included. Flexonic Corp.

409 Self-Cleaning Strainer—Bulletin 1210B describes self-cleaning, semi-steel pipeline strainers in sizes from ¼ through 3 in., featuring high strength construction of the bodies, long tapered screen socket, perforated heavy-gage screen. Includes dimensions, weights. Sarco Co., Inc.

FILTERS, FILTERING

410 Pipe Line Filters — Eight-pp Bulletin 200 contains detailed information on pipe line filters for air and other gases. Double action principle which gives sustained, trouble-free operation at high load factors is illustrated and explained. Specifications are included. Dollinger Corp.

411 Filtration Equipment — Eight-pp Bulletin GEO-506 describes filtration equipment for micronic clarification of all types of fluids; lubricating and fuel oils; liquid chemicals and petro-chemicals; compressed air, carbon dioxide, and other gases; hydraulic fluids; electroplating solutions. Commercial Filters Corp.

MECHANICAL POWER TRANSMISSION

413 Fluid Drive—Eight-pp Bulletin 9819 describes and illustrates adjustable speed Gyrol fluid drives, 1- through 25-hp, giving advantages and applications. Components and operation are covered in detail and selection tables given. Industrial Div., American-Standard.

414 On Drive Selections—Steps in selecting a heavy duty V-belt drive are outlined in 16-pp Bulletin DH-301. Service factor table, design horsepower table, minimum installation allowance table and complete selection tables are included. The Gates Rubber Co.

415 Adjustable Speed Drive—Six-pp Bulletin 2750 describes features and applications of an adjustable speed drive which utilizes a stationary field construction to eliminate brushes, commutators and slip-rings. Dimensions, engineering data and a

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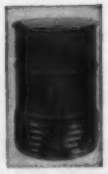

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cutaway view are included. The Louis Allis Co.

416 **Packaged Speed Control**—Bulletin 20,000, 8 pp, describes a line of packaged speed control drives which incorporate power conversion equipment for converting a-c to d-c power. Advantages are detailed and component features described. The Clark Controller Co.

417 **Anti-Friction Bearings**—Catalog 424-B, entitled "The broadest line in the anti-friction field," is an 8-pp folder giving capsule presentation of company's entire product line. A brief description of each product is provided. SKF Industries, Inc.

418 **Flexible Couplings**—Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings for power transmission. Tells advantages of these couplings. Thomas Flexible Couplings Co.

FANS, VENTILATING, AND AIR CONDITIONING

420 **Induced Draft Fans**—Catalog L-3 describes induced draft fans designed for any induced draft application for temperatures up to 800 F. Gives dimensions, capacities, as well as installation data. Fuller Co.

421 **Propeller Fans**—Bulletin A-109C, 32 pp, covers company's line of propeller fans, including standard propeller, utility, cool-blast, Lo-Noise, reversible and Bi-Pass duct fans, intake air units and unit heaters. Contains new fan sizes not shown in the previous edition as well as revised air deliveries, specifications. Hartzell Propeller Fan Co.

422 **Centrifugal Fans**—Bulletin 257 contains 32 pp of detailed information on direct connected and belt drive fans for ventilating and air conditioning installations. Sections of bulletin cover engineering and construction details and general engineering data, general fan performance laws, and specifications. Ilg Electric Ventilating Co.

423 **Industrial Fans**—Bulletin 690-A, 12 pp, contains dimensions and application and performance data on direct connected fans for general and system ventilation and power roof ventilators, with air deliveries to 103,200 cfm. Design features and typical installations illustrated. Propellair Div., Robbins & Myers, Inc.

424 **Standard Duty Fans**—Designs and construction details of company's line of standard duty fans are covered in 28-pp Bulletin 572. Points out advantages, shows arrangement and application, describes accessories. The New York Blower Co.

425 **Air Engineering**—Bulletin E-57 is a 24-pp air engineering data file covering engineering and test facilities for propeller fans, specifications, construction, maintenance, and installation. Tables for estimating air-

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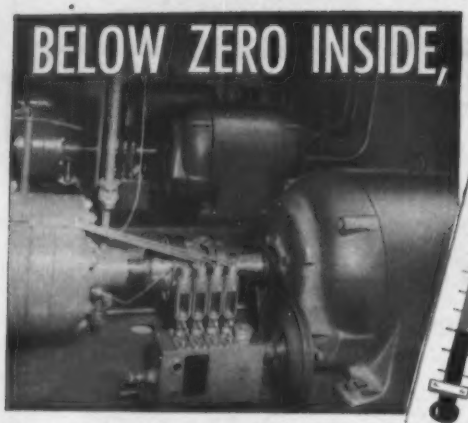

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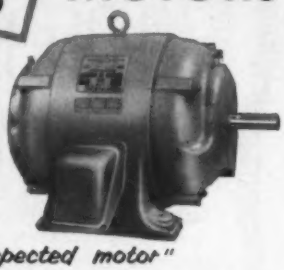

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DATA FILE

(Begins on page 190)

handling requirements, entrance and elbow losses are provided. Aerovent Fan Co., Inc.

426 Zone Control Cabinets — Air conditioning zone control cabinets are described and illustrated in 20-pp Bulletin AC-220. Separate sections with tables, curves and sketches cover proper unit selection, physical data, dimensions, fan performance and coil ratings for water cooling, direct expansion, hot water and steam. Buffalo Forge Co.

427 Air Conditioning—Featured in this 8-pp bulletin is company's line of products for air conditioning, as well as products for heating, ventilating and heat transfer. Typical installations are illustrated. The Trane Co.

METALS

429 Aluminum and Steel Data—Comprehensive selection data on aluminum and steel available in stock for almost every application is presented in this 242-pp buying guide. Necessary weights, dimensions and descriptive data are tabulated. Individual sections cover structural shapes, construction products, plates, sheets, hot rolled bars, cold finish bars, alloy and tool steel, tubing, stainless steel, aluminum, others. Joseph T. Ryerson & Son Inc.

430 Molybdenum in Steel Castings—This 36-pp brochure on the role of molybdenum in steel castings for industrial equipment discusses hardenability, tensile properties, fatigue, hardness, wear and impact resistance, machinability, and weldability of cast steels. Climax Molybdenum Co.

TOOLS, WELDING, AND MACHINE SHOP

432 Pipe Tools—Ordering and application information on Rigid pipe tools is provided in 16-pp illustrated Catalog 7596R-6. Wrenches, cutters, threaders, reamers, vises, and others are pictured and described, also power drives. The Ridge Tool Co.

433 Industrial Tools—Information on a complete line of industrial tools, including 500 new types and sizes never before offered, is presented in 120-pp Catalog 57. Included are complete lines of wrenches, socket wrenches, drop forged clamps, tool holders, set up and hold down tools, cutting tools and pipe tools. Photos, drawings and numerous charts aid selection. Armstrong Bros. Tool Co.

434 Industrial Wrenches Hand Tools—Tools for production lines, maintenance work and product servicing are presented in 156-pp Industrial Catalog 58-I. Loaded with pictures and tool facts, book describes in detail the complete line of over 4,000 tools—including chests and rollcabs, wrenches and sockets of all

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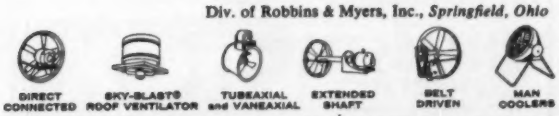

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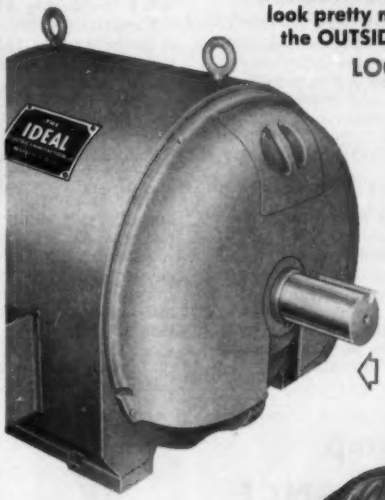

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Now, notice the cast-aluminum end shrouds with recessed access plates. Protection again—plus a big assist in maintenance and servicing. Lift the plate for oiling and inspection. Lift off the shroud for repair and overhaul.

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DATA FILE

(Begins on page 190)

types, screwdrivers, pliers, pullers, etc. Snap-on Tools Corp.

435 Portable Electric Tools—Form 10 features a complete line of portable electric tools including drills, screw-drivers, impact wrenches, magnetic drill presses, sanders, grinders, hammers, holesaws, and forged tools. The Black & Decker Mfg. Co.

436 Hydraulic Power Tools—Bulletin A-5-58 covers independent pump hydraulic jacks, single and double plunger hand pumps and double acting air engine pumps. Advantages are detailed. H. K. Porter Co., Inc.

437 Power Tools—Industrial construction and other portable power tools for the manufacturing, construction, woodworking and metal-working industries are described in this 55-pp catalog. Tools appear in logical sequence of size and duty rating. Skil Corp.

438 Where to Use Your Stud Driver—Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use in attaching pre-drilled fixtures. Remington Arms Co., Inc.

439 Welding Positioners—Illustrated and described in 16 pp Bulletin P-28 is a line of welding positioners ranging from 3000 to 100,000 lb capacity. Features and advantages are detailed, and dimensional diagram, and load tables included. Harnischfeger Corp.

440 Welding Wires — Submerged arc and inert gas welding wires are featured in Bulletin DH-402-C. Typical applications of various stainless steel, low alloy, and mild carbon steel automatic welding wires are described. Page Steel & Wire Div., American Chain & Cable Co., Inc.

441 Soldering Aluminum—Detailed information on soldering aluminum is presented in this reference bulletin. Includes data on soldering fluxes, irons and flames, and gives information on soldering methods, such as hot plate, dip, furnace, friction, glass fiber brush and ultrasonic operations. Reynolds Metals Co.

442 Data for the Shop—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. Conversion tables, steel numbering systems, machinability ratings. Standard Oil Co. (Ind.)

INSTRUMENTS, CONTROLS

444 Electronic Controller—Specification Sheet GE-60001 describes an electronic temperature controller for electric heat teating furnaces and other applications. Features and operation discussed in detail. Hagan Chemicals & Controls, Inc.

445 Precision Instruments—Catalog G1 contains 32 pp of comprehensive information on indicating, recording and controlling instruments. Contains descriptive and illustrative data on potentiometers, pyrometer supplies, systems and components, null indicators, amplifiers and oscillographs, pressure gages, flow and liquid level meters, pneumatic remote transmission, thermometers, panelboards, valves, diaphragm motors, motor and dampers, switches, etc. Minneapolis-Honeywell Regulator Co.

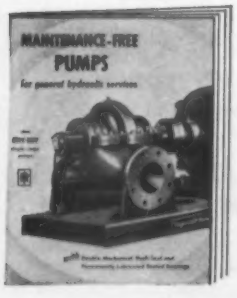
446 Control of Levels—This 16-pp illustrated booklet describes in detail the measurement and control of level in many processes. Covers applications of capacitance-type devices in quantitative measurement and control of granular solids, liquids, powders and interface. Several specific industry uses described. Instrument Div., Robertshaw-Fulton Controls Co.

447 For Limited Panel Space—Bulletin 532 describes Model 216 indicator used with company's automatic tank contents gage. Bulletin contains a full illustration of indicator which, although occupying a

pump MAINTENANCE got you down...

Look into these IR MAINTENANCE-FREE pumps for general hydraulic service

- Double Mechanical Shaft Seal eliminates stuffing box attention
- Permanently Lubricated Sealed Bearings never need oiling or greasing



Heads: to 350 ft.

Capacities: 250 to 2400 gpm

For complete information, send for Bulletin 7248-A.

Ingersoll-Rand

10-584

11 Broadway, New York 4, N.Y.

For more facts circle 649 on Reply Card

The easiest—and quickest—way to order bulletins and catalogs described in this magazine is to use the postage-free Reader Service Cards on pages 185-186.

All you need to do is circle the item numbers of those you want. Then fill in your name, job title, company name and address—and mail the card.

You may also use the Reader Service Cards to request information on products described, or literature mentioned in the ads—just circle the number below the ad.

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KOR . . . the perfect alkaline fuel oil conditioner . . . completely dissolves sludge, keeps it suspended in solution with the fuel.

KOR cuts fuel costs because it activates all the BTU's in the sludge and oil.

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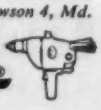

For more facts circle 652 on Reply Card

DATA FILE

(Begins on page 190)

small space, has a scale 20 in. long. The Liquidometer Co.

448 Graphic Instruments—Featured in 16-pp Catalog 657 is a line of graphic instruments designed to serve a variety of industrial measuring applications. Complete descriptive details on various types of recorders and accessories included, as well as ratings. The Esterline-Angus Co., Inc.

449 Meters Regulators, Valves—Bulletin C-5000, 28 pp, describes and illustrates meters, regulators and valves for a wide range of services. They include gas meters, gas pressure regulators, industrial meters, water meters. Information includes application suggestions, specifications and references to more detailed product literature. Valve section provides operational data, shows major valve patterns in Rockwell-Nordstrom line, explains design. Rockwell Mfg. Co.

HOSE

450 Flexible Metal Hose—Contained in this 36-pp bulletin is detailed information on characteristics and applications of company's flexible metal hose designed to serve a variety of industrial needs. Includes specifications, list of applications, and photos of the various types of hose available. Typical installations pictured. Pennsylvania Flexible Metallic Tubing Co., Inc.

451 Flexible Metal Hose—Detailed instruction on how to install all types of flexible metal hose properly, in order to secure the longest service are given in Bulletin N14A. Eight diagrams explain correct use of flexible connections to compensate for misalignment, and to eliminate vibration transmission. The Korfund Co., Inc.

452 Teflon Hose Assembly—Advantages of company's Springfield 120 Teflon hose assembly are detailed in this illustrated bulletin. Assembly procedure is pictured and described and design specifications are tabulated. Titeflex, Inc.

BOILERS AND GENERATORS

453 Bent Tube Boilers—Bulletin VF-VS2, 22 pp, describes a line of bent tube boilers designed to serve a wide variety of industries with diverse steam generating requirements. Principal data and schematic diagrams of typical installations included. Henry Vogt Machine Co.

454 Boiler Construction—Bulletin BE100 describes advantages of practical boiler construction with 2 pass design, featuring comparable results with equal heating surface, but with Continental's two-pass features—turbulent spinning gas technique-uniform heating, no refractory baffles and symmetry of furnace layout. Boiler Engineering & Supply Co.

455 Generators, Auxiliaries—20-pp Catalog SB 60, on steam generators and allied equipment, provides cross section views of major products to show design and construction. Standard and special boilers are included, also burners, stokers. Erie City Iron Works.

456 Package Steam Generator—This illustrated folder describes in detail features and advantages of company's line of package steam generators. Specifications are included. Cyclotherm Div., National-U.S. Radiator Corp.

457 Hot Water Boilers—Eight-pp Bulletin 1251 describes a line of packaged automatic boilers for forced circulation hot water systems. Design features and applications are described, and dimensional data included. Orr & Sembower, Inc.

458 Packaged Steam Generators—Bulletin B-3255 contains detailed information on shop-assembled steam generators in capacities from 10,000 to 60,000 lb of steam per hour. Advantages of construction, performance and mainteanance are illustrated. The Titusville Iron Works Co.

OTHER EQUIPMENT

459 Industrial Finishing Equipment—Catalog A657, 12 pp, describes

VIBRATONES **produce more noise, use less current, take less space, less time to install and need less attention, than any audible signal now on the market.**

Every feature of their design and construction is a radical departure from past practice. The simple 2-screw installation and adaptability to existing wiring devices, is an electrician's delight and a money saver for you. "Horn signals can save you money and even lives."

If you haven't read about the *VIBRATONE* write for Bulletin #27.

FEDERAL 8715 S. State St., Chicago 19, Ill.
Sign and SIGNAL Corporation

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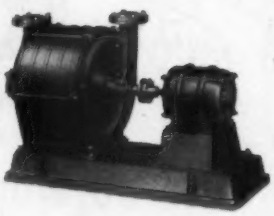
HOW TO GIVE PRODUCTION PROBLEMS THE AIR



Wherever plant operations and production schedules are dependent on the delivery of clean, dry air or gas at constant pressure it's likely that a Hoffman Multistage Centrifugal Blower or Exhauster is on the job. More than 50,000 Hoffman Blowers and Exhausters — many in continuous 24 hour service—currently provide clean, dry air or gas in production operations. These range from the delicate crating of farm-fresh eggs to the rugged demands of pneumatic conveying, production washing of foods, vacuum cleaning, wrapping, packing and stacking, sewage and industrial waste treatment, circulation of liquids, etc., etc. Hoffman Blowers and exhausters produce pressure up to 10 pounds per square inch or vacuum to 12 inches of mercury in volumes up to 20,000 cfm. Statically and dynamically balanced impeller assemblies insure quiet operation and maintain uniform pressure or vacuum without need for relief valves or pressure controls. Low power consumption, variable volume, quiet performance, low maintenance cost and easy installation offer additional production savings. For free illustrated bulletin AB 104 write Dept. LL, **U.S.Hoffman Machinery Corporation, Air Appliance Division, 103 Fourth Avenue, New York 3, N.Y.**

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The 42 LB.

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LIFTS • PULLS LOWERS 3300 LBS.

Single Line 6 TONS OR MORE

with pulley blocks

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Unlimited cable travel ... Portable ... Hand Operated

Standard equipment with refineries, engineering contractors, mines, pile drivers, railways, electricians, telephone and utility cos., steel erectors, plumbers, sawmills, all rigging.

One Year Written Guarantee

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Princeton Griphoist, Inc.

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Boston 19, Mass.

West of Mississippi

Griphoist, Inc.

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San Francisco 7, Calif.

½" wire rope

3,300 LBS.

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Shown above is 3000-cfm VAN-AIR Dryer—the type used by steel, automotive, chemical, container and other plants. Installed in compressor room it purifies and delivers clean, dry air to plant-wide operations. Many other capacities (see below) are also available in the complete line of VAN-AIR

COMPRESSED AIR DRYERS

THAT OPERATE FOR LESS THAN 1-CENT PER 15000 CU FT

The VAN-AIR Dryer is automatic. It purifies raw compressed air through a triple-action desiccator that extracts water and dirt—then reduces moisture to zero-dewpoint. It entails no heat, regeneration, volume loss or carry-over—under 1% pressure drop. The clean, dry, "instrument" quality of Van-treated air is indispensable for air controls, tools, processes, etc. as a guard against corrosion, pollution, dilution, freezing, etc.

22 STANDARD CAPACITIES— 25 to 3000 cfm 30 to 6000 psi

PATS. PEND.

Van-Air DRYER

PLANT ENGINEERS! With an eye to efficiency (cost saving, too) look into advantages of dry compressed air. Ask for brochure with dewpoint graphs.

VAN PRODUCTS CO. ★ Engineers ★ Manufacturers

5860 SWANVILLE ROAD, ERIE, PENNSYLVANIA

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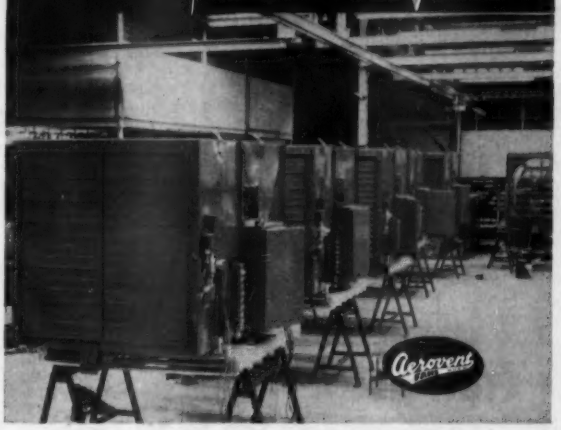
increase production capacity . . . improve fan and heating efficiency

with

gas-fired air make-up units



Pictured above is a portion of the final assembly line at Aerovent showing 8 units slated for delivery to a large Midwestern automobile accessory manufacturing plant. Designed to supply ample quantities of clean, pre-heated or cool, outside air to replace air exhausted by ventilating systems, the Aerovent Gas-Fired Air Make-Up Unit keeps air fresh; eliminates drafts and negative pressures. Safe, dependable operation and automatic, semi-automatic or manual control with natural, mixed, manufactured or propane gas.

For winter or summer use, these compact, packaged units are available in four unit arrangements and four sizes from 36" to 54" for various capacities, BTU ratings and pressure conditions.

Write for bulletin 880.

OTHER UNITS AVAILABLE FOR STEAM OR HOT WATER

Air deliveries of all Aerovent equipment are tested and rated in accordance with established and accepted codes and each unit is guaranteed by the manufacturer to deliver its rated performance.

CERTIFIED PERFORMANCE

Aerovent

FAN COMPANY, INC.

Ash and Bond Streets — Piqua, Ohio

For more facts circle 657 on Reply Card

DATA FILE

(Begins on page 190)

modern finishing system for cleaning, rust proofing, drying, painting and finish baking. The R. C. Mahon Co.

460 **Preheating Combustion Air**—This well-illustrated 36-pp booklet explains fuel savings and increased performance made possible by using waste heat in flue gases to preheat incoming combustion air. Also covers increased boiler output, ability to use lower grade fuels effectively. Air Preheater Corp.

461 **Industrial Equipment**—Featured in this 51-pp Bulletin is a line of equipment manufactured by this company, including such items as air releases, can filters, capacitors, circulating lubrication systems, rate of flow controllers, dispensing outfits, filters, indicators, lubricating units, meters, oilers, pumps, valves, and other products. Applications stories are included. Bowser, Inc.

462 **Plumbing, Heating Supplies**—Edition H is the current edition of this company's 126-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and illustrated, the catalog gives detailed information on uses. J. A. Sexauer Mfg. Co., Inc.

463 **Plastic Guide**—An evaluation of the properties of company's phenolics and polyester thermosetting molding materials and industrial and coating resins, as well as fire-retardant resins for translucent panels and coatings, is featured in this illustrated bulletin. Durez Plastics Div., Hooker Chemical Corp.

464 **Storage Racks**—Bulletin R-400, 12 pp, illustrates and describes a wide variety of storage racks manufactured by the company. Application drawings, photos and diagrams are included. Chicago Tramrail Corp.

465 **Steel, Alloy Fabrication**—All types of steel and alloy tanks and vessels fabricated by the company are described in this illustrated bulletin. Shows installations in a wide range of industries, including petroleum, chemicals, steel and atomic energy. Graver Tank & Mfg. Co., Inc.

466 **Compressed Air Dryer**—Featured in 12-pp Catalog D2-858NE5 is a dryer designed to provide dry, clean, safe compressed air for a variety of industrial uses. Describes features and operation, and includes dewpoint graphs, operating capacities and sizing graphs, and specifications. Van Products Co.

467 **Tripod Elevated Tank**—This illustrated bulletin describes the Horton tripod elevated water tank, designed to provide economical gravity water pressure for general service and fire protection in private water systems, others. Standard sizes included. Chicago Bridge & Iron Co.

468 **Cyclone Separators**—Featured in 8-pp Bulletin 712 are company's cyclone separators and pipe line after-coolers designed to provide cool, dry and clean compressed air and gases. Cutaway views illustrate component parts and features, and capacity tables facilitate selection. R. P. Adams Co., Inc.

469 **Oilers and Safety Cans**—Catalog 55-C covers company's complete line of oilers and oil and gasoline containers. Photos and drawings, as well as specification data and prices are included, and replacement parts are identified and pictured. An attached analysis sheet furnishes descriptive data. Eagle Mfg. Co.

470 **Reproduction Materials**—Provided in this 20-pp illustrated booklet on Kodagraph reproduction materials is a comprehensive materials selection chart designed to aid in finding material best suited to any reproduction job, from printed halftones, microfilm, and drawings with fine detail to soiled drawings and those in bad condition. Rest of booklet presents company's films, papers. Eastman Kodak Co.

471 **Industrial Fasteners**—Eight-pp Form 2449 describes standard precision industrial fasteners—including socket screw products, pressure plugs, locknuts, spring pins, dowel pins and steel collars. Provides design and applications information as well as specifications, photos, drawings and cutaways. Standard Pressed Steel Co.

WRIGHT Safeway Hand Hoists—In 12 Sizes —½ Ton to 50 Tons

WRIGHT Safeway Hand Hoists are built to take it—inside and out. Sealed construction protects all vulnerable parts in high analysis steel housing. Gears, pinions, drive spindle (also top and bottom hooks) are nickel-chrome-molybdenum alloy steel mounted on anti-friction bearings. Gear train is enclosed in oil-tight chamber. Load wheel, with 5 or more pockets, can be reversed for double life. Alloy steel load chain is heat treated to resist wear, ductile to withstand shock loads. Weston type load brake. Factory tested at 50% overload. Write to our York, Pa., office for Bulletin DH-164C.

WRIGHT HOISTS

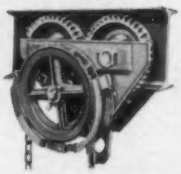
Wright Hoist Division • American Chain & Cable Company, Inc. ACCO

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

For more facts circle 658 on Reply Card

Smooth-Running Timken Roller Bearing Trolleys

Plain Timken Trolley



Geared Timken Trolley

WRIGHT Timken Roller Bearing Trolleys (shown), in plain or geared models, provide smooth, safe handling of ¼ ton to 40 ton loads with minimum of effort. Heavy steel side plates and chilled tread wheels revolve on Timken Bearings (two bearings to each wheel). Tapered bearing design absorbs both thrust and radial loads and thereby reduces the work required to move the trolley along I-Beam. Chilled wheel treads wear longer, assure wheel roundness. Wright Self Aligning Roller Bearing Trolleys in ½ ton to 20 ton models are also available.

Write to our York, Pa., office for Bulletin DH-242-B

WRIGHT TROLLEYS

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For more facts circle 659 on Reply Card

472 **Water Clarification**—How these flotation units achieve clarification of soluble coolants through adaptation of a basic principle of physics to a mechanical device is described in Bulletin FB-102. Advantages of the flotation units are detailed and cutaway view showing component features is included, also specifications. U.S. Hoffman Machinery Corp.

473 **Air Systems**—Bulletin S-4, 8 pp, describes ovens, dryers and heaters used to produce the "engineered atmospheres" required for paper drying and conditioning, pulp and paper mill ventilating, heating and cooling, paint finishing, hot blast cupola operation, and other processes requiring engineered air systems. J. O. Ross Engineering Corp., Div. Midland-Ross Corp.

474 **Cooling Towers** — Featured in 20-pp Catalog DFA-58 is company's double flow Aquatower, combining high efficiency with low silhouette. Specifications and engineering data are included, as well as dimensional drawings showing construction features. The Marley Co.

475 **Release Agent**—Technical Bulletin 19 describes a release agent which can be rubbed to an imperceptible film for easy parting of epoxy resin castings from plaster molds, or from metal, wood, or epoxy masters. Covers methods of applying the material and includes prices. Smooth-On Mfg. Co.

476 **For Cleaner Furnace**—The use and application of Oxi Crystals to keep furnaces and the fireside of boilers free of slag, encrusted carbon, soot and fire-scale is described in a recent pamphlet. Oxi Corp.

477 **Shot Cleaning System**—Bulletin 2145 describes a shot cleaning system for removing soot and ash deposits from horizontal superheaters, economizers and reheaters as well as internal surfaces of tubular air heaters. Typical system is pictured. Diamond Power Specialty Corp.

478 **Product Directory**—This product directory provides a basic source of information on company's divisions and products. Products are divided into major sub-groups—chain link fence, chemicals and coke, springs, belts, wire, wire cloth, etc. Brand names are given, as well as applicable reference literature. The Colorado Fuel and Iron Corp.

479 **Gas Turbines**—Described in 28-pp Bulletin 162 is a line of gas turbines offering special advantages and economies in the industrial power field. Cutaway views, flow diagrams and schematics illustrate details of performance and design, and performance curves and dimensional data are included. Clark Bros. Co.

480 **Compressed Air Chiller**—Bulletin 141 describes a compressed air chiller which provides cool, dry, clean air for instrument and process use. Illustration and description of the unit is included. Niagara Blower Company.

481 **Magnetic Equipment**—Product and application information on a line of magnetic separators, magnet automation units, and vibratory equipment is presented in 47-pp pocket-size Booklet B-575. Descriptive information and photos of typical installations. Eriez Mfg. Co.

482 **Thermoplastic Polymer** — Information on the properties of Penton, thermoplastic polymer, is presented in this 6-pp brochure. Lists mechanical, electrical and chemical properties and describes molding methods. Hercules Powder Co.

483 **Insect Control**—Featuring manufacturer's insecticides and insect control equipment, this practical 36-pp booklet provides excellent tips on the control of industrial insects. More than 60 pests are pictured along with specific information on where they are found, identifying features, extent of damage, life stages and cycles. West Chemical Products, Inc.

484 **Silicone Products** — The 1959 Reference Guide to company's silicone products tells which silicones can best meet the needs of a variety of problems ranging from adhesives to release agents, resins to rubbers, dielectrics to water repellents. Contains graphic examples of typical applications, as well as detailed selection data. Dow Corning Corp.

Light, Low-Cost Electric Chain Hoists

Two Capacities:
Single Chain–300 to 2000 lbs
Double Chain–3000 to 4000 lbs

The WRIGHT Electric Chain Hoist has fewer moving parts than any other chain-type electric hoist. Result: hoist working efficiency is increased, maintenance costs are decreased. This rugged, compact hoist features a double braking system—self-locking worm gear reduction, easy to adjust motor brake. Hoisting gears are made of high grade phosphor bronze—worms are heat treated alloy steel. All gears operate in a continual oil bath. Alloy load chain is wick lubricated for long life, heat treated for resistance to wear. Factory tested at 50% of overload.

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WRIGHT HOISTS

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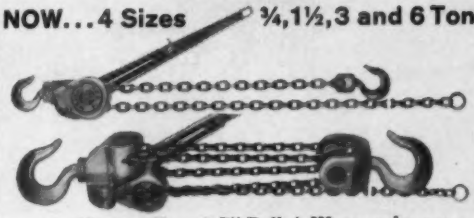
New ¾-ton Type "C" Pull-A-Way

NOW...4 Sizes ¾,1½,3 and 6 Tons



WRIGHT Type "C" Pull-A-Ways make easy work of hundreds of quick hook-up jobs. Now available in four sizes—¾, 1½, 3 and 6 ton—Type "C" Pull-A-Ways are portable, safe and rugged. Corrosion-resistant modern aluminum alloy castings are used for gear case, handle and covers of all models. Hooks, load chain and chain sheave are made of alloy steel. Positive, dependable load brake securely holds load at any point. Lubricated for life. Weights: ¾-ton, 14 lbs; 1½-ton, 23½ lbs; 3-ton, 36½ lbs; 6-ton, 63 lbs.

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WRIGHT HOISTS

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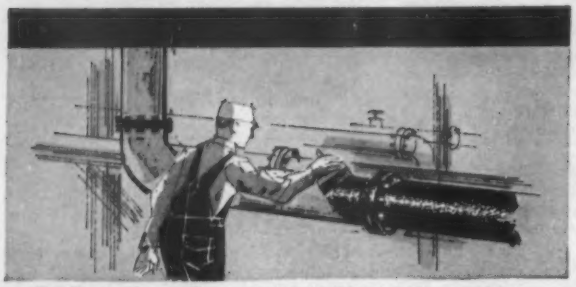
Industrial plants know Mortell products offer more positive protection than any other drip-and-rust preventive. Maintenance men know that paints or compounds of paint and fish oil provide little or no permanent protection. Rust-inhibiting NoDrip Plastic Coating is a moisture-proof insulation that *does* stop condensation . . . forms a seamless jacket . . . *does* stop corrosion. NoDrip Tape, with its triple insulating barrier, is equally dependable.



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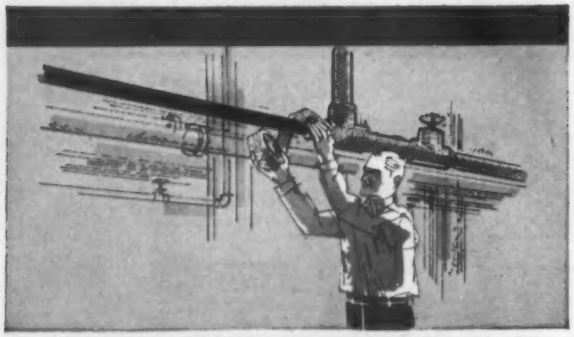
The heavy consistency of NoDrip outlasts many coats of paint or ordinary rust-preventives. Permanently insulates and protects. Applies easily with trowel, brush or special spray. Non-toxic, odorless and non-flammable. Resists acid, alkali, brine solutions or vapors. Available in 1, 5 and 55 gallon drums.



For Smaller Pipes or Tubing, Permanently End Condensation Drip, Rust and Corrosion With NoDRIP TAPE

An easy-to-use, wrap-around pipe covering, perfectly pliable, cork-filled, completely self-adhering. Forms an air-tight, 100% vapor- and moisture-proof jacket. Fits snugly even around tees, unions, angles, valves. Cuts maintenance costs—makes out-of-the-way storage areas useable—ends slip and slide floor hazards. No need for vapor seals, brads, fasteners or tools of any kind.

At all leading hardware, mill supply and plumbing jobbers. For complete information and technical handbook, write

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You'll benefit by big advantages

It pays to Specify

DARNELL CASTERS WITH PHENOLIC (DARNELLOPHEN) WHEELS

A TYPE AND SIZE FOR EVERY PURPOSE

- No rusting or corroding
- Non-marking
- Quieter rolling
- Will stand temperatures up to 200° F.
- High impact strength
- Resist oils, greases and most chemicals
- Wheels have beveled edges—protect floors better.

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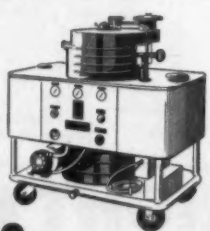
Turbo Model L-150 is an oil-fired unit built for continuous, uninterrupted production. No burn-out. No coil-clogging. No blow-back. No service problems with pumps. Moves easily right to the job on rubber-tired wheels, swiveled for turning. For steam-cleaning, paint-stripping, phosphatizing. Pays for itself in maintenance time saved.

Illustrated folder sent promptly on request



TURBO STEAM CLEANERS

TURBO MACHINE COMPANY, LANSDALE, PA.

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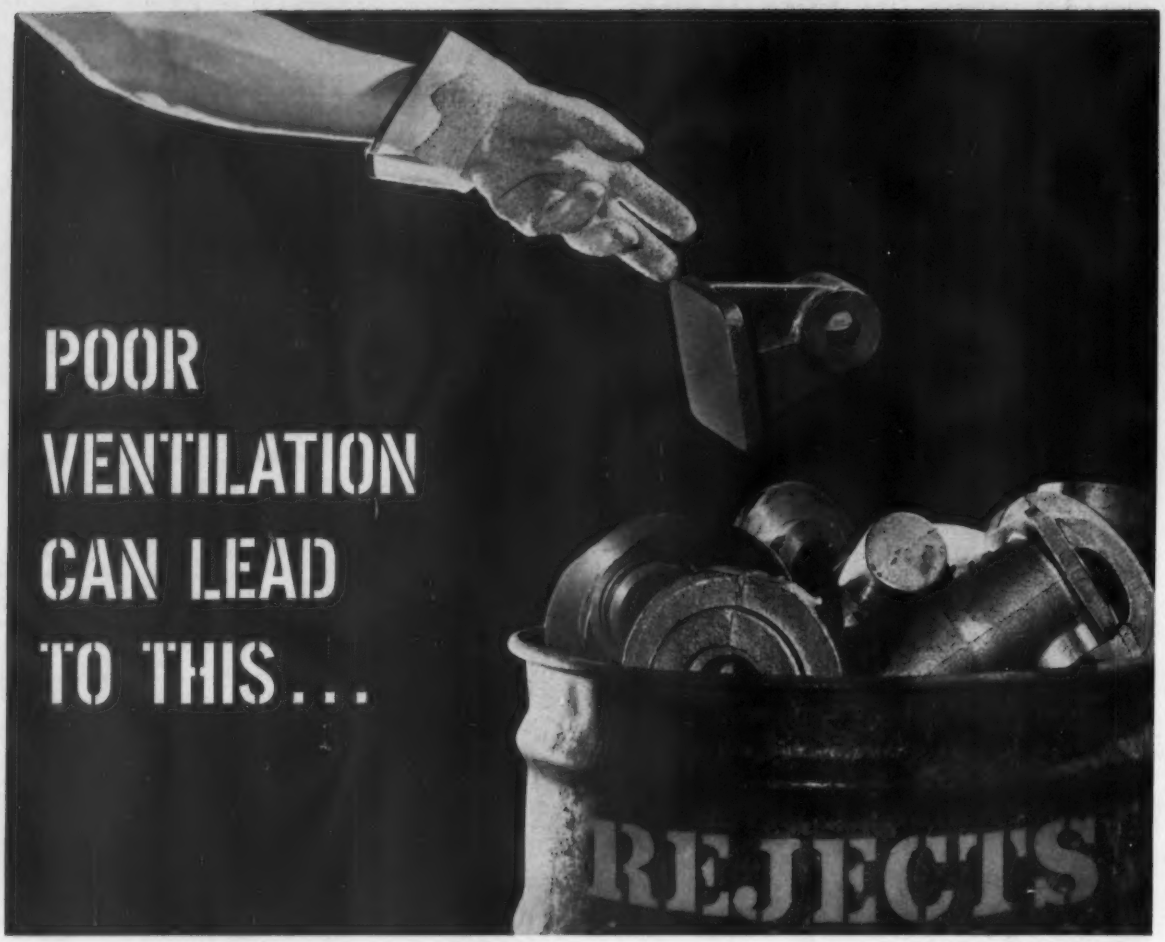

Hartzell ventilation can help prevent it

Bad ventilation is bad business when it can make the difference between a 2% and a 10% reject rate. And it *can* make that much difference . . . or more. No man can consistently turn out good work when he's stifled by heat, smoke or fumes.

There's no stock answer to the problem of providing proper ventilation for industrial buildings. But no matter what your specific problem, whether it's in the operation of an existing plant or the design of a new one, you can bet that Hartzell's complete line includes the fan, blower or ventilator that's right for your job.

Your nearby Hartzell representative will be happy to supply complete information. If you don't know him, drop us a line for his name and address.

here's a complete line of air moving equipment designed and built specifically for industry

Other famous Hartzell products include controllable and full feathering propellers for light aircraft, crop drying equipment and farm ventilating fans.

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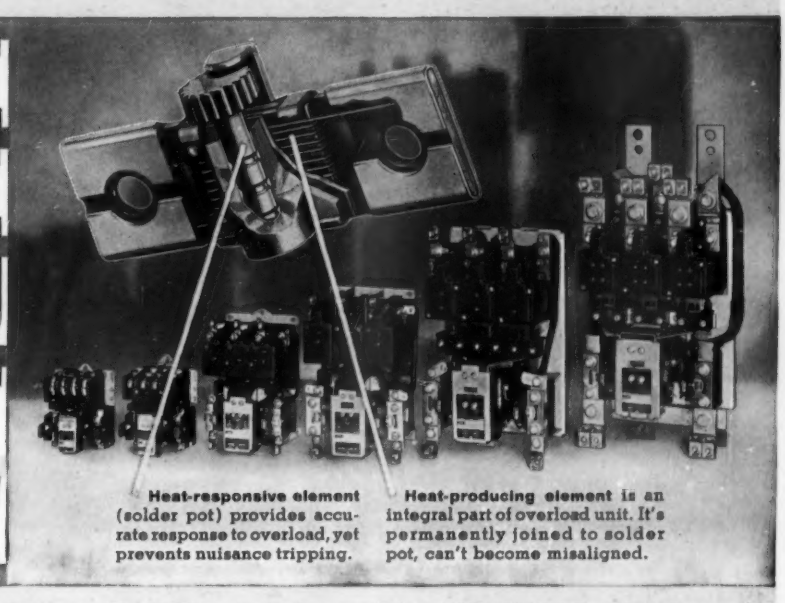
For more facts circle 665 on Reply Card

When you buy Motor Starters——

YOU PAY FOR OVERLOAD PROTECTION

BE SURE YOU GET IT!



Heat-responsive element (solder pot) provides accurate response to overload, yet prevents nuisance tripping.

Heat-producing element is an integral part of overload unit. It's permanently joined to solder pot, can't become misaligned.

Only ONE-PIECE Overload Relays can give 100% Protection Only with ONE-PIECE construction can you *know* you've installed the heater correctly. Only with ONE-PIECE construction can you *know* the heater is exactly centered, or properly positioned, so that it performs according to its rating. Only with ONE-PIECE construction can you *know* your starters will not operate without the thermal units properly installed. Only with ONE-PIECE construction can you *know* your motors have full protection.

Only Square D has ONE-PIECE Construction ONE-PIECE construction *eliminates* any possibility of heater misalignment. Square D melting alloy thermal overload relays can be installed only one way. They are tamper-proof. They are factory-assembled, are *individually* calibrated and tested. Repeated tripping will not affect their accuracy.

Insist on Square D starters with melting alloy thermal overload relays

LET US PROVE IT!

Let your Square D Field Engineer show you **1** how one-piece construction is accomplished and how easy it is to mismatch separate heaters and solder pots— **2** an endurance tester to prove that overload units can be reset repeatedly without damage while the solder is liquid— **3** a tripping time tester to compare various types of melting alloy units and to prove that tripping time won't change after repeated operation.

Write for Bulletin SM-275 for the complete story on Square D starters with ONE-PIECE thermal overload relays. Address Square D Company, 4041 N. Richards St., Milwaukee 12, Wisconsin

SQUARE D COMPANY

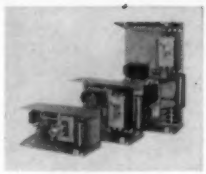
For more facts circle 666 on Reply Card

8-Hi Unitrol packs more control into less space

For true space-saving economy, install the new Cutler-Hammer 8-Hi Unitrol. Now *each side* of a *single* Unitrol Section will hold *eight* size 1 control units . . . or *five* size 2 units . . . or *four* size 3 units. And these control units are *NOT* restricted to just the minimum number of components. New compact unit design provides extra space for optional components such as a control transformer, control circuit fuses, terminal boards, three-coil overload relay, and push-buttons and indicating lights.

8-Hi Unitrol is built better to last longer

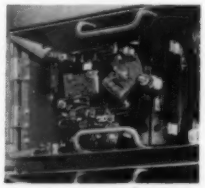
The new 8-Hi Unitrol is first to achieve a truly compact design without sacrificing structural stability. 8-Hi Unitrol retains all the extra construction features which earned Unitrol the reputation for outstanding ruggedness and dependability. Make your own comparisons and you'll agree 8-Hi Unitrol is built better . . . will last far longer.



8-Hi Unitrol offers extra control center flexibility

Here's *extra* value at *no* extra cost. 8-Hi Unitrol Control Units are available in both the standard and the new compact design for greater selectivity and flexibility. Add to this the modular unit construction and see how 8-Hi Unitrol not only affords greater space-saving, design flexibility, but also simplifies on-the-job modifications to keep pace with the user's changing control requirements.

8-Hi Unitrol is easier and safer to install



Available in type A, B, and C construction with class 1 or 2 wiring, you can choose the 8-Hi Unitrol that affords the greatest installation economy. U-shaped plug-in control units eliminate buried components . . . provide wide-open accessibility and visibility. Exclusive "safety-lock" test position insures safe assembly, wiring and testing of every control unit. Plug-in power contacts are self-aligning . . . eliminate hazardous manual adjustments.

Be sure you have all the facts on the new Cutler-Hammer 8-Hi Unitrol today . . . its many extra features assure you easier, more economical installations; and longer lasting, trouble-free operation for its user. Write now for the new descriptive Bulletin EN142-N274
CUTLER-HAMMER Inc., Milwaukee 1, Wisconsin.

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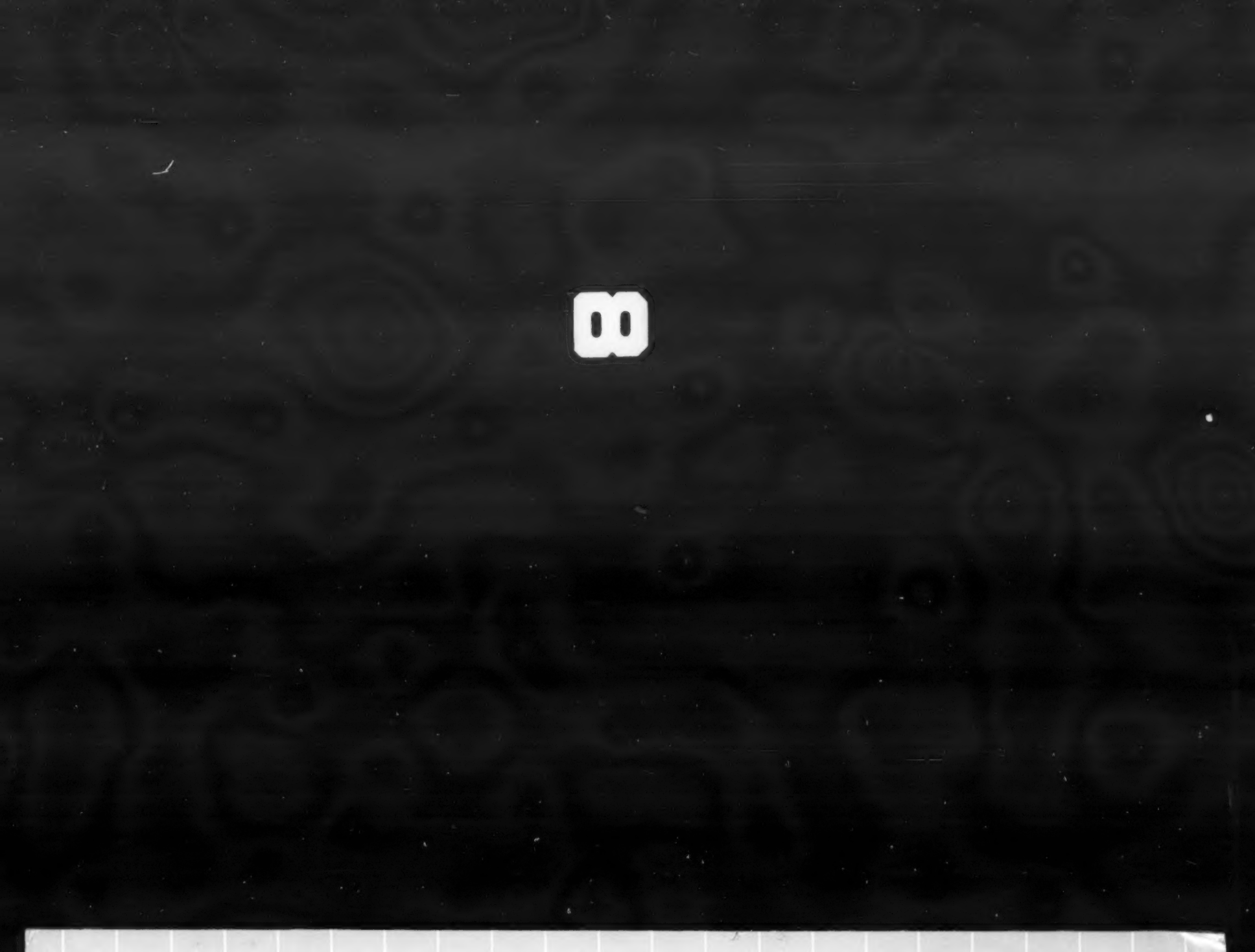

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Volume 13, No. 8 Circulation of this issue 51,603